STUDY OF THE OPERATIONS OF THE FISH AND WILDLIFE SERVICE

HEARINGS

BEFORE THE

COMMITTEE ON MERCHANT MARINE AND FISHERIES HOUSE OF REPRESENTATIVES

EIGHTY-FOURTH CONGRESS

FIRST SESSION

MARCH 2, 3, 8, 9, 10, AND 15, 1955

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STUDY OF THE OPERATIONS OF THE FISH AND WILDLIFE SERVICE

WEDNESDAY, MARCH 2, 1955

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D. C.

The committee met at 10 a. m., pursuant to call, in room 219, Old House Office Building, Hon. Herbert C. Bonner (chairman), presiding.

The CHAIRMAN. The committee will be in order.

This morning we start a series of hearings with the Fish and Wildlife Service of the Department of the Interior.

The first witness will be the Director, the Honorable John L. Farley.

STATEMENT OF JOHN L. FARLEY, DIRECTOR, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

The CHAIRMAN. Will you give your full name and background for the record?

Mr. FARLEY. John L. Farley, Director of the Fish and Wildlife Service, Department of Interior.

We appreciate, sir, this opportunity to tell you of our Service and to discuss some of the problems and get the benefit of the exchange of information that we will receive from this opportunity. We propose first today to cover those things of rather general application and interest, and then, as the opportunity comes in the additional sessions, to deal with the details of our operation.

I think that perhaps it would be worth while to review for a moment the background of the present Fish and Wildlife Service. The first agency was created as a Bureau of Fisheries with a Commissioner of Fisheries back in 1871, primarily as a scientific service for the Federal Government. As time went on the need for control developed and the needs of management developed. So those activities were added to the old Bureau of Fisheries, which remained as an independent agency for some years until, I believe, in 1903 it became a part of the then created Department of Labor and Commerce. Later in 1913, when the labor and commerce activities were separated, it became a bureau of the Department of Commerce. It continued in that Department until 1939 when, under Reorganization Plan No. 2, it was transferred to the Department of the Interior.

The other branch of the present Fish and Wildlife Service's major activities was created originally as a division or a part of the Division of Entomology in the Department of Agriculture. That occurred in

1885. That attained bureau status in 1905 and it in turn was transferred from the Department of Agriculture to the Department of Interior in 1939 under the same reorganization plan.

In 1940 these two agencies were combined in the Department of Interior into the Fish and Wildlife Service essentially as we have it today. In both of those activities the original purpose was scientific. So all through the years the backbone of the two organizations has been the development of knowledge and information based upon scientific studies and statistics, and making that information available both to the Service and to outside agencies to enable them to better manage the fishery and wildlife resources of the Nation.

That brings us up to the organization as we had it approximately a year ago when the Secretary of the Interior appointed a survey team to study the operations of the Fish and Wildlife Service and make recommendations for reorganization, if it were indicated, and for the improvement of the quality of the work that is being done.

The first chart which has been distributed to the members of the committee shows the organization of the Fish and Wildlife Service as recommended by that committee and duplicated in somewhat similar form in this chart, the Director getting legal aid from the Solicitor's Office, which is now not a part of the Fish and Wildlife Service but a part of the general service furnished by the Department of the Interior.

There is an information officer who reports directly to the Director.

The divisions are slightly changed from the organizations which many of you were familiar with in the past years. One division is the Division of Administration, and that is supervised by Mr. Albert Day. It takes care of budget management, personnel, and procurement. That is essentially as it has been over the years.

Another division is the Division of Technical Services where there are grouped together the River Basin Studies, Federal Aid, Lands, and Engineering, all of which activities overlap the fields of the other activities of the Fish and Wildlife Service. So, in the opinion of the survey team, they should be grouped together and, instead of having two of them, River Basin and Federal Aid, report directly to the Director and get the supervision that would be possible under those conditions, they should have a more closely knit organization with the supervision of an assistant to the Director, who is Dr. Lloyd Meehean, who many of you remember for a great many years as Chief of the Game Fish and Hatcheries Activities of the Service.

Then there is the Wildlife Division along the general lines that existed over the years and with some changes which I will point out. There is a Fisheries Division again on the general plan of the past, and the survey team recommended a new position of an Assistant Director for Field Operations. It was felt, as the result of the study made by that team both in the central office and the regional offices in the field, that there was need for a more closely coordinated relation between the regional offices and the central office, and to provide that they recommend this position. At present, that position is being occupied by Mr. Ernest Swift, who is also in charge of the Wildlife Division.

The members of the committee may wonder why the position has not been filled. There have developed some questions as to the legal-

ity of the creation of that third position and that has not yet been ironed out.

I would like to point out some of the major differences in this organization over the past, differences that perhaps are not too apparent here. In the past there was a Division of Research with a Chief provided, and then, of course, the Branch of Fishery Biology and the Branch of Wildlife Research. The survey team members felt that there was too wide a separation of the research and study activities of the Service and the application of the results of those studies in the management of its resources. Consequently in their recommendation Wildlife Research was separated from the overall research and put under the supervision of a management officer, the Assistant Director for Wildlife.

The same thing was true with the Fisheries research. It was put under the Assistant Director for Fisheries and made one of his responsibilities.

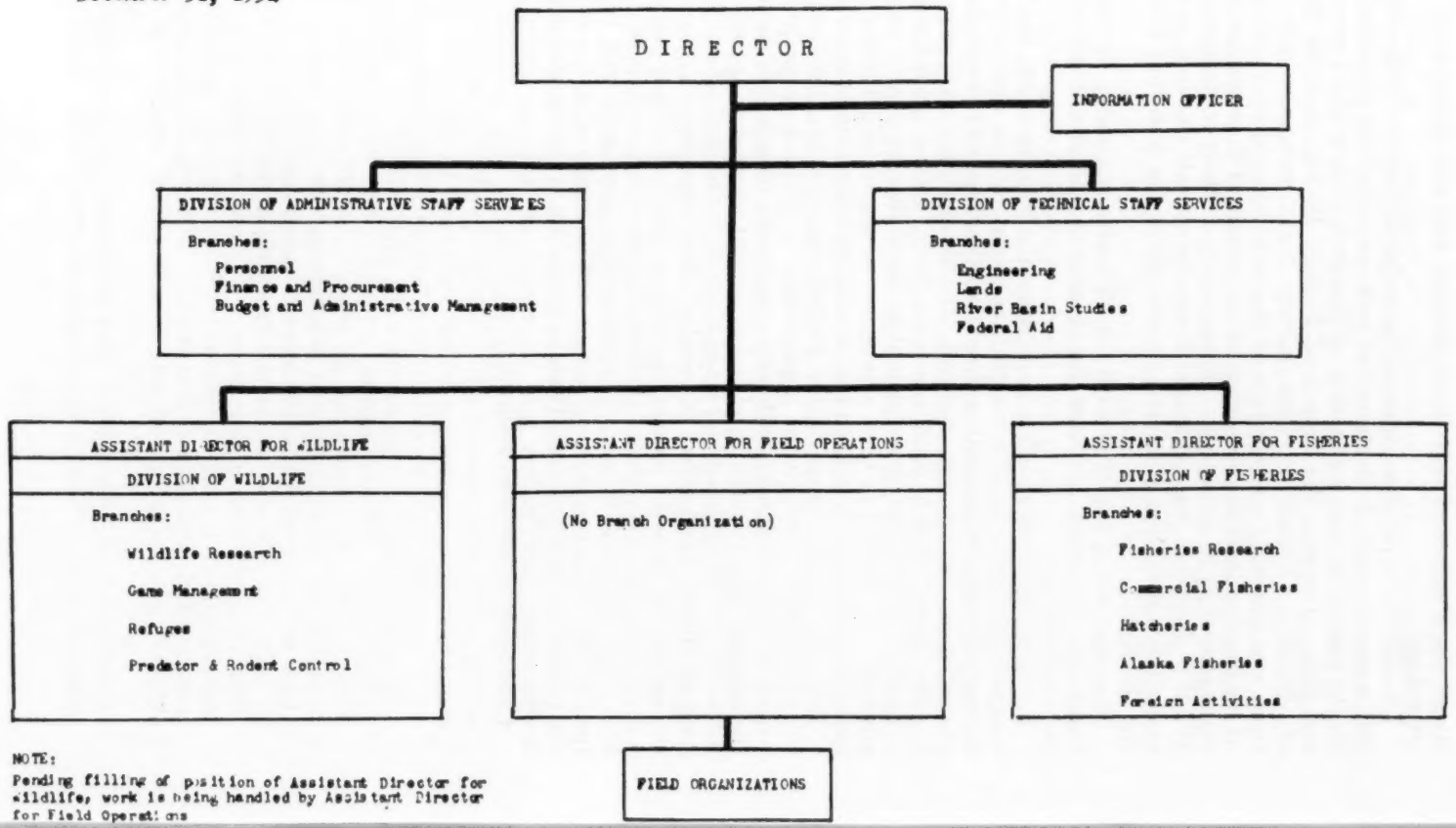
Further, there was an effort to separate the basic research, the long-range or general type of research that might well be done with and through a central organization, from the other type of research known generally as management research, the things that somebody that handled game or fish problems must know rather immediately to determine what his program should be for a year, or 2, or 5 years, in advance. So there has been a program of separating further those basic research activities from the so-called management research.

The other main change in the former organization type was that the six regions in which the organization is divided geographically would be delegated more authority and would have in the hands of the regional directors the handling of a great many details that heretofore have been referred and acted upon in the central office. In the long run it is expected that the central office organization, even with the indication of some expansion, will be reduced. That reduction will be taken up in the regional offices and elsewhere and there should be a slight increase, if any. If there is any increase it will be well justified by the improved service that will be rendered in the field by the regional organizations. That, in the main, is the central office or headquarters organization.

(The chart referred to follows:)

HEADQUARTERS ORGANIZATION FISH AND WILDLIFE SERVICE

December 31, 1954



NOTE:
Pending filling of position of Assistant Director for Wildlife, work is being handled by Assistant Director for Field Operations

Mr. FARLEY. Going to the regions, the survey team recommended an information officer. At present we are not set up with that position. That function is being emphasized in the regional office organization. The same four divisions were created. Instead of having an administrative officer and 1 assistant, as was the case in most regions, it now develops that we have in effect an administrative officer as 1 of the assistants and then 3 other assistant regional directors as a type pattern. The technical staff is much the same as we have had in the central office. There is the Fisheries Division and the Wildlife Division.

In some regions where the fishery activity is not as dominant as it is in others, it may be some time before an assistant will be appointed to fill that position, but the organization will follow in general that type pattern.

I wonder, Mr. Chairman, if before leaving the organization as such, there might be some questions which you wish to ask regarding that.

The CHAIRMAN. Mr. Tollefson.

Mr. TOLLEFSON. Is there any overlapping? I notice that over on the right-hand side you have "River basin studies" under "Technical services." Could you tell us more about "River basin studies"? Perhaps that would answer my question.

Mr. FARLEY. River basin studies will be covered in detail in one of the later sessions. It is one of those activities that reaches into all of the fields of our operation, and to quite a degree Federal aid does the same thing. Because of their general application they were assembled in this grouping, but with the coordination closely with all of these.

Mr. TOLLEFSON. Maybe the questions I had in mind will be answered when you get into the discussion of those items.

Mr. FARLEY. I think so. Yes, sir.

Mr. TOLLEFSON. I have no further questions.

The CHAIRMAN. Mr. Boykin.

Mr. BOYKIN. I want to say that as long as Mr. Farley has Mr. Day as his first assistant he cannot make mistakes. Mr. Day has been in this work for 30 years and I think he is a great man.

I think, Mr. Farley, that your statement is fine. I regret that I could not hear all of it, but I am going to read every word of it and send it to my paper. I think that you have one of the most important positions in this country and one that does everybody a lot of good.

Mr. FARLEY. Thank you, sir. We will try to measure up to that.

The CHAIRMAN. Mr. Farley, has more attention been given to the field operation as against the concentration in office operation?

Mr. FARLEY. Yes, sir. That was very much in the minds of the survey team and very much in our minds.

The CHAIRMAN. What are the actual facts about it?

Mr. FARLEY. As of today we are in this position, Mr. Chairman: During this transition of shifting responsibilities from the central office to the regional office and continuing the workload that goes on during the year and part of next year, there will appear to be a slight buildup of office activity. Following the readjustment and the actual picking up of the load, there will be, and must be, if this is an effective program, a reduction in our central office load and consequently, a reduction in our personnel. It would be unthinkable to go through a

readjustment of this type and, doing the same work, end up with an equal or larger central organization than we had before.

The CHAIRMAN. Mr. Tollefson asked for the comparison between the central office and the regional offices. What he evidently had in mind, and what would appear from the charts and what we all have in mind, is that the regions practically duplicate the central office.

Mr. FARLEY. I understand. When Mr. Tollefson asked the question I thought it was on overlapping of the other activities. Quite a bit of the detail that has been heretofore handled in the central office will be shifted to the regional office for determination, which will lessen the load in the central office; but there will still be the need of an overall supervision and checking of the service to make sure of uniformity of application, and to facilitate dealing with national organizations that are interested.

The CHAIRMAN. Let us get down to concrete facts. What will be the change in personnel in the offices as it will exist under this plan, differing from what it was under the former plan on down to the regional office? Will you eventually get more game protectors and supervisors in the field than you have in offices?

Mr. FARLEY. There will be two things, sir, that I think will determine that. First, will be the effectiveness of doing this, and this reorganization plan would not be an effective program if it did not end up with more, as you say, work in the field. If we consider the regional office activities right now, there is more work in the field. As this irons out under our present allotments of money, it is my feeling that the immedate result will be a much better service in the field rather than having immediately more people in the field so that, instead of 2 people unrelatedly working in an overlapping way on a project, it will be coordinated in the regional office so that those 2 people will be doing different jobs instead of the same job. There will be a greatly increased efficiency of operation. I think that that will be the immediate reaction.

The CHAIRMAN. Would it be fair to say that for each game protector in the migratory waterfowl division out in the field there are about 10 or 15 people in the offices?

Mr. FARLEY. Those figures, sir, do not reflect in my recollection of the proportion.

The CHAIRMAN. What is the actual fact of the matter?

Mr. FARLEY. I do not have that information here. I will be very happy to produce it for you, sir.

The CHAIRMAN. I am interested and I know that this committee is interested in this subject. We want to see a uniform system of protection of migratory waterfowl, and we want to see the funds set aside for it utilized for the best advantage for the protection and perpetuation of this species of American game. It is a fact that it is dwindling as years go by?

Mr. FARLEY. I am able, sir, to tell you at this time that in our Washington office we have 313 employees and in the 6 regional offices a total of 430. In the field outside of the offices we have 2,555. That is this month's figure, sir.

The CHAIRMAN. How many protectors do you have for migratory waterfowl?

Mr. FARLEY. There are approximately 102 or 104.

The CHAIRMAN. In all of the United States?

Mr. FARLEY. Yes, sir.

The CHAIRMAN. Would you reread the figures for administrative personnel?

Mr. FARLEY. It is a total of 313 in the Washington office.

The CHAIRMAN. There are 313 in the Washington office?

Mr. FARLEY. Yes, sir; and 430 in the regional offices.

The CHAIRMAN. That is a total of how many?

Mr. FARLEY. Seven hundred and forty-three. All the rest in the field total 2,555.

The CHAIRMAN. There are 2,555 game protectors?

Mr. FARLEY. No, sir; that is a total of people in the field in game refuges and fish hatcheries and laboratory work, and so on, outside of the regional and central offices.

The CHAIRMAN. I was attempting to see how many people were protecting migratory game and how many were required in administrative work for each of those protectors.

Mr. FARLEY. There is, of course, a close coordination and cooperation with most of the State game agencies. There are some 2,111 deputy game wardens with whom we cooperate and it is a coordination rather than supervision.

The CHAIRMAN. We are going to have this as one of the subjects?

Mr. FARLEY. Yes, sir; the game management will be a separate subject.

The CHAIRMAN. I will not belabor the point, but I wanted you to know that I am tremendously interested in seeing that we have a sufficient number of protectors in the field, actually in the field. I am also tremendously interested in seeing that the same regulations as to shooting over baited blinds, and so forth, exist in each State. I want you to know that we will discuss that while we have you here and we will discuss it in more detail when it is taken up as a subject.

Mr. FARLEY. We have a little more than an average of two enforcement agents per State on the Federal payroll. The rest of them are carried as State deputy enforcement officers. Without the cooperation of the States, I could almost say that we would be helpless in doing an effective job.

Mr. BOYKIN. Mr. Chairman.

The CHAIRMAN. Mr. Boykin.

Mr. BOYKIN. As you probably know, I have a very large game preserve. I had a group of people down there this year. We killed 68 deer and 48 turkeys. We had your Fish and Wildlife man there and we had the State man there. I import my own wild turkeys. I got them this year from your State of North Carolina and they are wonderful. I also had a lot of eggs last year, none of which hatched, however.

Since I am expecting to invite some very important people from all over America to come down to the preserve and I had my son conduct a count. He tells me that last Sunday he counted 400 wild turkeys. He said that some of them had very long beards. He said that the gobblers and the hens have separated.

Mr. Tom Balshe, the president of the Burning Tree Club, visited our preserve and said that he has hunted all of his life and has hunted in many places, and that this was the best stocked game preserve he

had seen. He said that he counted 52 deer between our clubhouse and the lake. This proves what can be done with effort. The State helps more than the Federal. They have 1 or 2 men for every county. I cooperate with the State people and with the Federal people, too. Consequently, we have more game there now than we had when the Indians were there.

When Mr. Day was Director he always helped me, and I know that you will help me, too. Your men are wonderful to us. With the proper cooperation we can have double the amount of game we have now. There is no doubt about it. I know, because I have done it myself. I hope that you will go down sometime and see it with me. It makes you feel good to think that your children and your children's children can have this thing that our forefathers had in the years gone by.

I have been able to interest the most wonderful people and bring them down there to hunt and to show them that part of the country. It means a lot, and gives people more pleasure than anything else.

My wife found a story in last Sunday's paper about the President finding buckshot in a wild turkey. I shot that turkey. I was riding along, the turkey flew up and I shot him with buckshot, so I sent him to the President. The FBI men were excited because there was buckshot in the turkey and the President got the buckshot.

It is a wonderful sport, the greatest sport in the world. We do not use them ourselves. We use them for people who never had that sport before.

Mr. PELLY. Are those turkeys migratory?

Mr. BOYKIN. They will go 5 to 8 miles and not much farther. They can fly about a half mile. This particular turkey which I sent to the President had a beard 11 inches long.

These turkeys are hard to raise. We raised more this year than we have ever raised in our lives because it was a very, very dry year. A lot of them came to us because we have lakes fed by springs and when you have water you have the feed for them in the swamps there.

We have over 50 miles of roads that we maintain ourselves. My son, who has charge of the venture there, is a game warden for the State. I have five men who get the timber and they are all game wardens only on our own property. We have a hard time keeping poachers out, but all and all it is wonderful and your Department and the State do fine work in our district. We cannot ask for better supervision than your men give us.

Mr. PELLY. I think the committee ought to investigate that.

Mr. BOYKIN. We had President Truman's plane down there. Gen. Nathan Twining was there, and Homer Gruenther, the special assistant at the White House, was there. General Twining shot a deer. One night at 1 o'clock we counted six deer in front of the clubhouse.

Everyone can have this game if they will follow your directions. The chairman is saying that we need this work in the woods, and that is true. Mr. Bonner is certainly going to try to help you in every way he can and we are going to help him as our chairman on this wildlife problem because it is certainly important.

I have hunted in Alaska and Mexico, but there is no better hunting than what we have in Alabama on the Tombigbee. We have bear and turkey.

I saw where the President flew a thousand miles and stayed 2 days and shot 2 quail. I have flushed 25 coveys of quail and never shot a one, but the doctors at the clubhouse had been feeding them. There were 30 on the front steps of the clubhouse.

Glenn Martin has one of the greatest game preserves I have ever seen. He has done a great job on geese and ducks.

Mr. TOLLEFSON. Mr. Chairman, I suggest that the committee ought to visit some of these places.

Mr. BOYKIN. I invited the chairman, and I will take you all down there any time you want.

Mr. FARLEY. I wish we had more contributions of that kind to our work.

Mr. ALLEN. Mr. Chairman.

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. Mr. Farley, I think I understand the chart fairly well. I like the decentralization, but what is bothering me a bit is trying to get a general picture of the philosophy which controls the operation of your office. What are your major programs and how do they stand in balance? For example, is it a principal endeavor to regulate an existing commercial resource, or a principal endeavor to build it up, or to keep it at a level for future use; or is the principal endeavor on the wildlife or migratory fowl? Generally, how do the activities stand in balance and importance?

Mr. FARLEY. That question is a very pleasant one to answer because it is so vitally important to us. First of all, it is our program to gather as rapidly as possible the basic information that is necessary to manage a resource, fisheries and the wildlife resources; and, secondly, having that knowledge, to find out, speaking of course of game that is used and fishes that are used for sport and commercial purposes, what the maximum sustained usage of those can be, and to build it up to those levels. It is found that a maximum annual crop sometimes comes with a lesser total population because of the reproductive urge that comes with these wildlife birds and fishes and animals. So the answer is not always a very simple one, but our objective in the Fish and Wildlife Service is to find out, in those fields where they are used for sport and commerce, what the biggest possible annual yield can be; and to regulate it on the basis of maintaining stock to produce that; and not simply just to preserve for preservation's sake at some level that we may have assumed in the past to be the desirable level.

I think that that philosophy requires a rethinking and revision on our basic Alaska laws which require us in all cases, irrespective of our judgment, to let 50 percent of the salmon run go by. In lean years, 50 percent of the stock going upstream to spawn would be wholly inadequate to properly seed the beds. In bumper years, 50 percent of the total number of fish would be a greatly excessive number to go up there. They might well be used.

That principle applies to your waterfowl and to your fur. I think that in general that is the answer to the broad question you have asked: to find out how much we can get, rather than how little we can get out of the resource.

Mr. ALLEN. I have another question along the same line. What does your Department do, and what does the State government do with regard to resources? For example, the resource that comes first

to mind as far as I am concerned is California sardines, which used to produce some 300,000 to 600,000 tons of fish a year and is now down to 3,000. Whose responsibility is it, or was it, in the development, preservation, and use of that resourse? Was it State, or Federal, or a combination of both?

Mr. FARLEY. I believe, sir, that it was the combination. At the time that I was in charge of the California work we had 600,000-ton bumper years. I think that at one time it nearly approached 700,000 tons of sardines. If my memory serves me, they brought a price delivered at under $6 a ton. I think the information that has come this year on the pickup of the activity of the sardine resource there is quite hopeful. It may be coming back. Both the State of California and the Fish and Wildlife Service in conjunction with the other agencies have joined in a combined research on the sardines in an effort to discover the causes of these fluctuations.

I think that to date no satisfactory explanation has been advanced as to the practical disappearance of the sardines over those years.

Mr. ALLEN. How in the operation of the Department do you coordinate the work of the Fish and Wildlife Service and the work of the various States?

Mr. FARLEY. Through our research and through the Assistant Director that is responsible for the fisheries. There are a number of groups and conferences and interstate agencies that meet on these problems. Then there is an allocation of fields of activity so that there will not be an uneconomical duplication. As far as the agencies are able, within their available funds, they pursue those activities.

Mr. ALLEN. That is a voluntary and rather informal arrangement to suit each purpose?

Mr. FARLEY. Yes, sir.

Mr. ALLEN. No definite organizational method of going at it is involved?

Mr. FARLEY. In the case of the sardines, definitely so. We have similar problems in the Northwest in the salmon, where an allocation of program is made in connection with the Columbia River. With the funds available from the transfer from the construction agencies there is an allocation by agreement between State activities and Federal activities.

Mr. ALLEN. Thank you very much.

(The chart referred to appears on p. 11.)

The CHAIRMAN. Do you have a question, Mr. Robeson?

Mr. ROBESON. No questions.

Mr. FARLEY. Because there may be some question about our geographic regional setup, I would like to show next a chart showing our regional organization geographically, with the exception of Alaska, which is too big and too far away to show on this particular map.

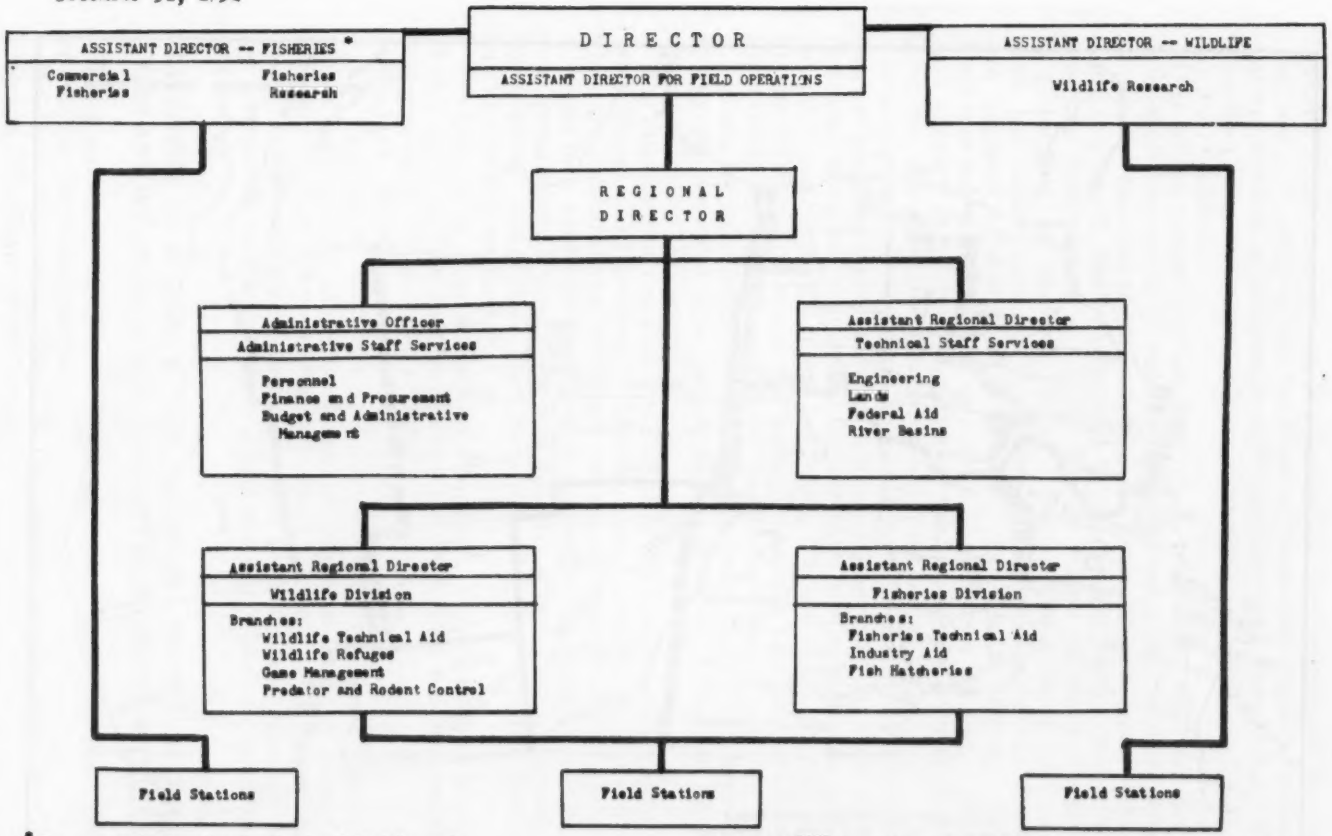
(The chart referred to appears on p. 12.)

Mr. FARLEY. The black lines show regions 1, 2, 3, 4, and 5, and I have superimposed on that for discussion later some red lines to show the flyways, the major flyways of the country under which we manage the migratory waterfowl. I will comment on those later.

Mr. Chairman, because it has been a matter of some discussion, I wish to bring the attention of the committee to a recommendation of the transfer of Maryland to region 4 or the Southeast region. That

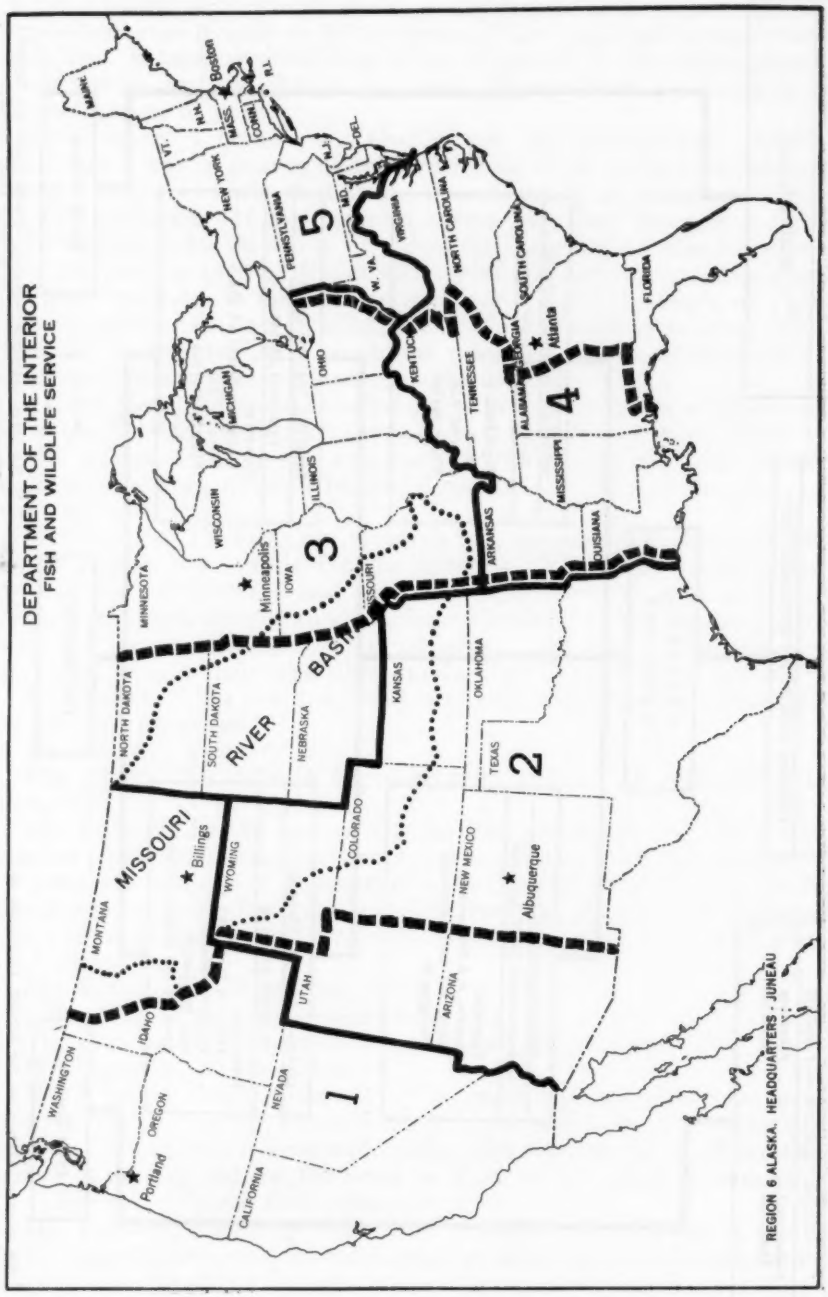
FIELD ORGANIZATION FISH AND WILDLIFE SERVICE

December 31, 1954



* Has responsibility also for Foreign Activities and Pribilof Islands Administration

NOTE: The three Assistant Regional Directors and the Regional Administrative Officer have equal staff status.


DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
MISSOURI RIVER BASIN
REGION 6 ALASKA. HEADQUARTERS - JUNEAU
1
2
3
4
5
Portland
Billings
Albuquerque
Minneapolis
Atlanta
Boston
WASHINGTON
OREGON
CALIFORNIA
IDAHO
NEVADA
MONTANA
WYOMING
UTAH
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has been under study by our Service and in the Department for some time now. A study of the workload of those two regions indicates that more travel is involved in covering Maryland from the Atlanta office than from the Boston office. That certainly must be a factor in any final decision.

One of the points that has been made in wishing this transfer is because of the migratory-waterfowl problem, and the State's membership in the regional organization of the State fish and game departments. I would like to point out to the committee that this flyway embraces both regions 4 and 5. Region 4 also embraces the lower half, roughly, of another flyway. Region 3 embraces the major part, the north part, of the Mississippi flyway, and an important segment of the central flyway. The Pacific flyway again flows over regional lines and cuts down as shown on the map. So we have in every region, in every flyway, this problem of overlapping of interests. In general it has not been a problem as such.

Two regional directors are involved in each flyway. At the moment it appears rather a difficult thing to work out in view of the increased workload that would be necessary in this region to service an additional State, and in our judgment it would not be compensated by the lessening of workload that would come from the continued supervision as we have it now from the Boston area.

I think, for relief of monotony, Mr. Chairman, that I will leave this flyway problem and take up our financing which I wish to have a chance to review at this session.

The financing of the Fish and Wildlife Service is a rather complicated thing. The revenue is from so many sources, so many questions are constantly raised about our appropriations, that I thought it would be a worthwhile subject to present to the committee. With your permission, I would like to have Mr. Albert Day, Assistant to the Director, and former Director of the Fish and Wildlife Service, handle that subject for me.

The CHAIRMAN. Come right up, Mr. Day. This is the only hearing of this type that has been held since the Robertson select committee held similar hearings. Is that correct?

Mr. DAY. That is correct, Mr. Chairman.

The CHAIRMAN. That is why I thought that this was a subject in which many people would be interested, and that hearings should be held on it. That subcommittee has ceased to exist. During its life it was the responsibility of this committee to hold these hearings and get you people here to tell the wildlife story in which all America is interested.

STATEMENT OF ALBERT M. DAY, ASSISTANT TO THE DIRECTOR, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

The CHAIRMAN. Mr. Day, will you give your name, title, and background for the record, please.

Mr. DAY. My name is Albert M. Day, assistant to the Director of the Fish and Wildlife Service.

Mr. Chairman and members of the committee, I am delighted to have an opportunity to appear and discuss this very important problem with you. As the chairman has said, there was a time when we had

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annual hearings and made the record as to what was going on in the fish and wildlife field, appearing before Senator Robertson's committee at the time when he was a Member of the House.

Following that, there were rather frequent items of legislation on which we appeared before this committee and were able to outline our overall program; but for the past 2 or 3 years there has not been a great deal in the way of national legislation so that the Service has not had the opportunity to come before you.

I am delighted with the program which this committee has set forth to discuss the work of the Service.

Mr. Farley has asked me to outline for you some of the complicated fiscal and financial problems that go to make up the handling of this great national and international program. We have distributed for you these large, rather unwieldy, charts which I would like to take as the subject of my text.

(The table referred to follows:)

Total amounts available to the Fish and Wildlife Service and distribution by programs (in dollars), budget estimate, fiscal year 1956

	Annual definite appropriations				Annual indefinite			Permanent indefinite appropriations			
	Management of resources	Investigations of resources	Construction	General administrative expenses	Management of resources (25 percent)	Administration of Pribilof Islands	Migratory bird conservation account	Management of national wildlife refuges	Federal aid in fish restoration and management	Federal aid in wildlife restoration	Expenses for sales
1. Administration of fish and game laws	1,492,500				675,000		1,020,000	300,000		19,000	
2. Propagation and distribution of food fishes	3,005,000										
3. Mammal and bird reservations	876,000				27,400		2,220,000	1,480,000			
4. River basin studies	337,000				30,000		250,000				
5. Control of predatory animals, etc	920,000										
6. Soil and moisture conservation	98,000										
7. Research on fish and fisheries		2,289,000							25,100		
8. Exploration, development, and utilization of fishery resources		1,108,000									
9. Research on birds and mammals		430,000				49,000	185,000			251,000	
10. Research on fish migration over dams		150,000									
11. Construction and land acquisition, fish facilities			140,000		12,000						
12. Construction and land acquisition, wildlife facilities							600,000			400,000	
13. General administrative services				760,000	41,248		225,000	95,000	25,000	120,000	
14. Administration of Pribilof Islands						[1] 1,931,000					
15. Federal aid payments to States									4,582,900	10,346,800	
16. Administration of Federal aid									167,000	464,200	
17. Expenses for sales											30,000
18. Lower Columbia River, operation and maintenance											
19. Lower Columbia River, construction											
20. Payments to counties in lieu of taxes											
21. Available in subsequent years:											
(a) Current year receipts									1,930,552	4,399,000	
(b) Federal aid payments to States							3,344,173				
(c) Other						156,567					
Total program	6,728,500	3,977,000	140,000	760,000	785,648	2,136,567	7,844,173	1,875,000	6,730,552	16,000,000	30,000
22. Prior year balances available for this program					−24,148	−308,967	−3,344,173		−1,730,552	−5,000,000	
23. Return to parent agency											
Total appropriation	6,728,500	3,977,000	140,000	760,000	761,500	1,827,600	4,500,000	1,875,000	5,000,000	11,000,000	30,000

Total amounts available to the Fish and Wildlife Service and distribution by programs (in dollars), budget estimate, fiscal year 1956—Con.

	Transferred funds						Budget estimate, 1956	Difference
	Payments to counties	Promote and develop fisheries, etc.	Corps of Engineers operation and maintenance	Corps of Engineers construction	Other transfers and working funds	Total program, 1955		
1. Administration of fish and game laws						3,573,800	3,506,500	−67,300
2. Propagation and distribution of food fishes					6,780	2,744,800	3,011,780	+266,980
3. Mammal and bird reservations						6,773,830	4,603,400	−2,170,430
4. River basin studies					239,500	823,390	856,500	+33,110
5. Control of predatory animals, etc					36,460	992,143	956,460	−35,683
6. Soil and moisture conservation						98,000	98,000	
7. Research on fish and fisheries		1,323,000			40,000	4,255,790	3,677,100	−578,690
8. Exploration, development, and utilization of fishery resources		1,527,000			49,000	2,453,906	2,684,000	+230,094
9. Research on birds and mammals					29,000	924,340	944,000	+19,660
10. Research on fish migration over dams						150,000	150,000	
11. Construction and land acquisition, fish facilities						351,850	152,000	−199,850
12. Construction and land acquisition, wildlife facilities						1,536,571	1,000,000	−536,571
13. General administrative services		150,000	15,000	15,000	10,500	1,462,870	1,456,748	−6,122
14. Administration of Pribilof Islands						1,638,450	[1] 1,931,000	+292,550
15. Federal aid payments to States						14,678,151	14,929,700	+251,549
16. Administration of Federal aid						644,100	631,200	−12,900
17. Expenses for sales						30,000	30,000	
18. Lower Columbia River, operation and maintenance			985,000			955,500	985,000	+29,500
19. Lower Columbia River, construction				1,385,000		2,935,604	1,385,000	−1,550,604
20. Payments to counties in lieu of taxes	625,000					564,353	625,000	+60,647
21. Available in subsequent years:								
(*a*) Current year receipts		1,207,826				11,615,666	7,537,378	−4,078,288
(*b*) Federal aid payments to States							3,344,173	+3,344,173
(*c*) Other					6,731	178,302	163,298	−15,004
Total program	625,000	4,207,826	1,000,000	1,400,000	417,971	59,381,416	54,658,237	−4,723,179
22. Prior year balances available for this program		−1,207,826			−6,731	−17,169,980	−11,622,397	+5,547,583
23. Return to parent agency						+2,342		−2,342
Total appropriation	625,000	3,000,000	1,000,000	1,400,000	411,240	42,213,778	43,035,840	+822,06

[1] Includes $700,000 to be covered into Treasury as miscellaneous receipts.

Mr. DAY. The Service has probably a more varied realm of activities than any phase of Government with which I am acquainted. We are involved in international compacts and in work in all of the 48 States, and in the Territories, over a broad line of scientific and biological subjects. For that reason, our financing is also a complicated sort of thing.

This general heading at the top of the chart shows the category of appropriations under which the Service operates: annual definite; annual indefinite; permanent indefinite; and transferred funds.

If you will turn to the next to the last figure on the lower right-hand corner, it shows the budget estimate of total appropriations for 1956 in the sum of $43,035,840. That is the amount in the 1956 budget for appropriation or for approval of the Congress to carry on the work of the Service for this year. However, of that amount, only about one-fourth comes out of the general taxes of the United States Treasury. Approximately three-fourths of the service appropriations come from special funds, many of them levied against the people who benefit most by the Service activities.

The first four columns to the left under "Annual definite appropriations for management of resources" over through "General administrative expenses" represent the actual amount which comes out of the General Treasury.

Mr. TOLLEFSON. Mr. Chairman, may I ask a question?

The CHAIRMAN. Mr. Tollefson.

Mr. TOLLEFSON. You say that about three-fourths of the funds come from special funds?

Mr. DAY. That is right.

Mr. TOLLEFSON. You are speaking of duck stamps, and things of that kind?

Mr. DAY. Yes.

The CHAIRMAN. The shotgun tax?

Mr. DAY. That is right.

Mr. TOLLEFSON. Does that go into the general fund, and is it then appropriated out?

Mr. DAY. Some does, and some does not.

Mr. TOLLEFSON. Does some come directly to the Fish and Wildlife Service?

Mr. DAY. Yes. I can detail those later.

The first four columns represent the actual amount which comes out of the General Treasury, $11,605,500. That total does not show on your chart. I have added it up.

Taking the next items, the "Annual indefinite" and the "Permanent indefinite," we find a total of $28,619,100. Those are the funds that come from the sale of surplus products on Federal refuges, for instance, and special assessments on the fishermen and hunters to improve their sport. That is the 10-percent excise tax on fishing tackle and the 11 percent on arms and ammunition. Three million dollars comes from a duty on fishery imports.

In addition to that, under the transferred funds, there is a total of $2,811,000 transferred from the Corps of Engineers to the Fish and Wildlife Service, to provide facilities, hatcheries, and ladders, and things of that kind to mitigate the damages and losses that follow the construction of dams on the Columbia River. That is largely a Northwest program.

In general, about one-fourth of the Service total program comes from general funds, and the balance of it, or approximately three-fourths, comes from special assessments, from receipts from refuges, and so on, as outlined above.

Now, discussing in more detail these indefinite funds, I would like to take up the "Annual indefinite" category listed at the top of the page under "Management of resources," administration of the Pribilof Islands.

The Pribilof Islands are the home of the world's greatest fur seal herd. Eighty percent of the world's seals come to these islands for mating and for rearing their young each year. This area has been under the management of the United States Government under treaties with Russia, Japan, and Canada since late in the last century. Now, under a provisional agreement with Canada alone, since the Japanese war.

We annually take 60,000 or 70,000 sealskins from the surplus, 3- and 4-year-old males of the herd. Those are processed and sold, and bring into the Federal Treasury something like $3 million or $4 million per year after they are sold.

Congress in 1950 authorized the use of all of the receipts from the Pribilof Islands to administer the islands. Prior to that time it was on a basis of annual appropriations. There the United States Government supports some 650 Aleut natives, and a huge business operation, which was difficult to operate on an annual basis. So Congress passed a special act and authorized us to use, subject to appropriation by Congress, the receipts from the sale of the fur sealskins up to 60 percent for the administration of the islands. With that money we have been able to construct some new buildings that were wrecked during the war, to improve the administration and operation, and to organize a real going-business concern.

So, up to 60 percent of receipts from the sale of furs is appropriated each year for the administration and management of the Pribilof Islands operation.

In addition to that, Congress has authorized the use of 25 percent of these fur seal receipts for use on the mainland of Alaska. There it can be used for protecting the very valuable fish and wildlife resources, both game and Alaska fisheries, salmon and halibut, and others in the Alaskan program. The other 15 percent goes into the Federal Treasury and is not available for appropriation.

The CHAIRMAN. On that seal proposition, do you have exclusive jurisdiction over the protection of seals and the furs and the sale of the furs?

Mr. DAY. That is correct, Mr. Chairman.

The CHAIRMAN. What does the Coast Guard do with respect to that?

Mr. DAY. The Coast Guard there, as elsewhere, cooperates in some regulatory matters, though it enters very little into the Pribilof operations.

The CHAIRMAN. The Pribilof area is the sealing area? Is Russia sealing in that area?

Mr. DAY. Russia carries on their sealing operations to the westward. They have a separate seal herd and do not intermingle much. Most of the American seal herd comes down through the Aleutian chain and spends the year in the Northern Pacific. They may come as far

south as California, but they go back in the spring to the two islands of St. George and St. Paul of the Pribilofs where they come in a total of perhaps one and a half million animals. That is the total United States herd of the herd.

We provide, under an agreement with Canada, that they receive 20 percent of the skins. The United States retains 80 percent, but the Fish and Wildlife Service retains entire responsibility for the administration.

The CHAIRMAN. What is the present condition? Has it decreased or increased over the past 15 years?

Mr. DAY. It has reached a rather stable population. At the present time it levels off at the approximate same number each year. We take around 60,000 to 75,000 surplus skins each year, and have done so the past 10 years.

At the present time the number is fairly well limited by disease among the young. The rookeries where the young are born are infested with a hookworm, and we have biologists on the job now trying to discover if there can be some diminution of the loss of the young. There could probably be a larger herd if we can overcome some of the disease handicaps, but the herd seems to have leveled off at present.

The CHAIRMAN. Do you use any funds for fumigation?

Mr. DAY. In the islands?

The CHAIRMAN. Yes.

Mr. DAY. Yes; we have 1 or 2 scientists stationed on the islands with a laboratory there where they carry on many experiments. The hookworms go into the soil and remain during the winter and they are trying to fumigate the soil.

The CHAIRMAN. There are no commercial seal on the North Atlantic?

Mr. DAY. No, sir. Not fur seals.

The CHAIRMAN. Mr. Miller.

Mr. MILLER. How are the seals taken? By license to professional hunters, or do you take them?

Mr. DAY. No; the seals are all taken under the very close supervision of the Fish and Wildlife Service. It is a very interesting operation. The first Seal Act provides that only native Eskimos may actually kill the seals. The sealing operation, as organized, is really a well-organized production process. We do not have a great deal of time for taking these skins because the season is short.

The life of the fur seal is rather a complicated story. One male seal will accommodate up to 50 females, which leaves a rather large surplus of males. The males do not reach sexual maturity until they are 5 to 6 years old, at which time they begin fighting their elders to share the females in the harems. In the meantime the young males herd together; from the time they are 2 to 4 or 5 years old, they congregate together in small pods while the old bulls attempt to drive them away from the family harems.

During the sealing season natives come between the harem herds and these pods of bachelor bulls and drive the latter back onto the prairies where they kill them with clubs. The natives are very expert. They can determine by looking at an animal whether it is a 3- or 4-year-old male or whether it is a female, and they kill only the surplus males.

In that fashion we take something like 70,000 surplus 3-year-old bulls each year.

Mr. MILLER. At what age is the skin its maximum value?

Mr. DAY. At 3 years, in general, sometimes at 4 years. That is before they start fighting among themselves and injuring their pelts.

The CHAIRMAN. Mr. Sheehan.

Mr. SHEEHAN. You say "we take." Do you mean the Fish and Wildlife Service?

Mr. DAY. Yes. The Federal Government owns and administers the herd and supervises the taking of the skins, which are later turned over to a fur company in St. Louis which processes the furs. They are shipped in barrels to the Fouke Fur Co. at St. Louis which has been under contract with the Government for more than 40 years, I would guess. These skins are sold at public auction and the Government retains title until they are sold and then pays a commission to the fur company for the processing operations.

Mr. SHEEHAN. So, for all intents and purposes, the United States Government is in the fur business?

Mr. DAY. So far as the taking of the skins is concerned that is true.

Mr. SHEEHAN. They keep title to them until they are sold?

Mr. DAY. Yes.

Mr. SHEEHAN. There is no private industry that gets into the picture until they are sold at public auction?

Mr. DAY. Yes, when the tanned and dyed furs are ready to go into the manufacture of the coat.

Mr. SHEEHAN. That would probably make the United States Government the largest fur industry in the country, from the point of view of ownership?

Mr. DAY. I expect so.

Mr. MILLER. Will the gentleman yield?

Mr. SHEEHAN. Yes.

Mr. MILLER. How about the Eskimo that actually kills the seal? Is he paid a salary, or is he paid by the number of animals he kills?

Mr. DAY. He is paid both. All of the working native Aleuts are paid an annual wage. At the time they are not doing work in connection with the seals, they are preparing roads and docks and working otherwise for the next year's season. They are actually paid by the Government on an annual basis. However, there is also a sliding scale, as my recollection goes, with a bonus for the number of animals taken to provide an incentive for the more skilled workers. The killers, in fact, get the largest amount.

Mr. MILLER. Mr. Chairman, this opens up something that is very interesting. I would like to pursue this following what Mr. Sheehan has said. What is our relation to these Aleuts on the island? Are we sort of a protective, paternalistic group? Do we pay them a wage? Is there any incentive, or is it just a subsistency amount of money? In other words, are they wards and are we continuing them in that position, or are they American citizens? What is their position?

The CHAIRMAN. I see that the Director wants to get into this.

Mr. FARLEY. We have listed as a separate subject of discussion the Alaska fur seal. I wonder if we could take it up at that time?

Mr. MILLER. I will withdraw it, but I would like to go into that.

The CHAIRMAN. The Government is perpetuating these seals. Otherwise the herd would be exterminated in a few years. Is that right?

Mr. FARLEY. The herd was down, and when the Government took it over it was practically extinct.

Mr. SHEEHAN. They could protect them without being in the business.

Mr. TUMULTY. The young seals are killed and the old bucks are not?

Mr. FARLEY. Yes.

The CHAIRMAN. Mr. Day, you may proceed, because when we have this subject in its entirety I can see that it is going to be a very interesting matter.

Mr. BOYKIN. Can you use the meat?

Mr. DAY. It is processed, made into meatmeal and oil. We have a processing plant on one of the islands where it is rendered down to meal and oil.

Mr. ALLEN. Mr. Chairman, may I ask a question?

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. Mr. Day, I am a little curious as to this financing—60 percent produces about $3 million. Is that the figure? The $3 million is the basic figure and about 60 percent is available for spending in the Pribilofs?

Mr. DAY. 60 percent is $2,136,000 which is available for expenditure in the Pribilofs.

Mr. ALLEN. I started in on a basis of 650 people. That would be about $3,000 per capita. I was wondering how you would spend it.

Mr. DAY. Much of that amount now is spent for the reconstruction of housing as the islands were very badly torn up during the Japanese invasion during the war. The United States had military personnel stationed there and the houses which were old, suffered much damage.

Not by any means, does that all go into the maintenance of the families themselves.

Mr. ALLEN. Is there a separate income before the $3 million accrues that is used for wages?

Mr. DAY. No, it comes out of that.

Mr. ALLEN. How is the group governed, or is there any government?

Mr. DAY. Yes, they have a considerable degree of self-government. They have their own community organizations under the Indian Organization Act. The Territory of Alaska passes on the standards of the schools. The Territory passes upon the standards of medical health. The Pribilofs are integrated as an Alaskan community.

Mr. ALLEN. That does not have any other income, other than the 60 percent that you make available?

Mr. DAY. No.

Mr. ALLEN. Does the Government have anything to say about how much you give them, or is that strictly within your control?

Mr. DAY. Yes. Wages and allowances are worked out largely on agreement with the native community organizations.

Mr. ALLEN. As a matter of absolute right, what you say about the money would prevail?

Mr. DAY. Yes; the money is under the control of the Service, but the natives have their organization. They have their elected officials and we work with them trying to set up wage scales and adjusting their living conditions.

Mr. ALLEN. That would sort of make you the benevolent dictator of the Pribilof Islands.

Mr. DAY. Perhaps, but some of them are still rather primitive.

Mr. TUMULTY. As primitive as they are, they have their annual wage already.

Mr. SHEEHAN. Are they primitive enough not to pay income taxes?

Mr. DAY. I think they pay income taxes. As Mr. Farley stated, there will be a more complete discussion by personnel actively in charge of this program.

Passing on from the Pribilofs, the next item under the indefinite appropriation is the migratory bird conservation account which is commonly known as the duck stamp. Back in 1934 Congress passed an act that provided that anyone who hunts ducks legally above the age of 16 should have a Federal duck stamp at the cost of $1.

Mr. MILLER. Is there any significance to that interlining of "legally"?

Mr. DAY. Perhaps that should be deleted. Because the duck stamp money was not keeping up with the demands of the Service program, Congress again in 1949, before this committee, held extensive hearings and raised the price of the duck stamp from $1 to $2, and also raised the amount of money that could be spent for enforcement of the laws to 15 percent. So at the present time this item represents the income from around two and a quarter million to two and a half million duck hunters each year who pay $2 apiece for their stamps, this money to be used 15 percent for administration and enforcement of the laws, and the balance for purchase and development and maintenance of waterfowl refuges and for research into problems pertaining to migratory waterfowl. The duck stamp funds amount to approximately $4½ million per year.

The CHAIRMAN. In that column the total program was $7,784,000. Then in the prior year there was a balance available for this program. Do you mean that you had a balance from prior years of $3,344,000?

Mr. DAY. Yes, sir. We normally attempt to carry an entire year's receipts in the fund before it is expended. That is, we do not normally spend this year's income until next year; so that, by the end of June you have the previous year's receipts that are held over as a balance to carry on the following year. That has been done deliberately because of the need for a cushioning of moneys in case we should have to close the duck hunting season sometime, perhaps, to provide drastic protection, so that you would have a year's balance to carry on the refuge program.

The CHAIRMAN. That explains it. I was interested to know about that. This is a means of protecting next year's program?

Mr. DAY. That is right. It gives us a year's cushion.

The CHAIRMAN. It does not reflect the fact that you collected a tax which you did not use?

Mr. DAY. No, sir.

The CHAIRMAN. That is the reason I asked the question.

Mr. DAY. No; we figure that it is good administration to have a year's balance at hand.

Mr. THOMPSON. Mr. Chairman.

The CHAIRMAN. Mr. Thompson.

Mr. THOMPSON. There is a balance of $4,500,000 listed in the total appropriation. Where is that appropriation made from?

Mr. DAY. The funds are available for expenditure after release by the Bureau of the Budget, but they are shown in the President's budget as an appropriation.

Mr. THOMPSON. Are they actually acted on by Congress the same as an appropriation from the Treasury funds?

Mr. DAY. We do not justify them in the same detail before the Appropriations Committee. They are funds which are available until expended. We do, however, give a complete accounting to the Appropriations Committee, and the Bureau of the Budget holds strings on it, if you please, by holding back a certain amount quarterly until it is needed for expenditure.

Mr. THOMPSON. They are appropriated through prior dedication?

Mr. DAY. That is right.

Mr. MILLER. Are all of those funds made available each year other than this amount that you hold back to take care of the yearly emergency? Are all of the other funds distributed, or is some held back to become a lump-sum in the Treasury awaiting distribution?

Mr. DAY. No; they are all appropriated to the Service under the act.

Mr. MILLER. Under the Migratory Bird Act?

Mr. DAY. That is right.

Mr. THOMPSON. Do you know what the balance is at present in the duck stamp fund that might be surplus over and above what is required, even considering this 1 year's receipts as a cushion?

Mr. DAY. Approximately the amount shown at the bottom of that column of $3,344,000.

Mr. THOMPSON. Does that increase each year?

Mr. DAY. That is very stable, about the same amount each year. We have that amount carried over each year as a cushion. What is spent and the income is about the same. The duck stamp money has been stable for the past several years.

Mr. Miller. This money, of course, is used for the enforcement of the law, is it not?

Mr. DAY. Up to 15 percent is used for administration of the act which includes enforcement of the law. It includes payment to the Post Office Department of $170,000 a year for printing and distributing the stamps. The other 85 percent is used to purchase, to develop, to manage, to administer, and maintain waterfowl refuges and to carry on essential research. From that fund we send crews into Canada each year to find out the status of the breeding birds in order that we may make up-to-date regulations. We send observers into Mexico in the winter. We carry on much in the way of investigations from this fund, but it is all for migratory waterfowl.

The CHAIRMAN. You have about reached the maximum of land acquisition for refuges, have you?

Mr. DAY. No; we are a long way from what should be acquired.

The CHAIRMAN. That comes from this fund. That is the reason I was asking. I wanted to get into the record whether you were or were not reaching the maximum, because if you were this stamp

might be reduced. The answer is that you have not reached the maximum?

Mr. DAY. In fact, we are a long way behind. That will be discussed in detail under the refuge discussion, showing how far behind we are in present needs.

Mr. MILLER. On the fiscal end of it, I think it would be interesting to put into the record at this point the breakdown of that 85 percent as to the amount that is spent for investigations, and the amount spent for land acquisition.

The CHAIRMAN. You say that this subject is going to be fully developed by the Director of Land Management? Is that right, Mr. Day?

Mr. DAY. Yes, by the Chief of our Branch of Wildlife Refuges.

Mr. MILLER. My point is as to the fiscal breakdown of this thing which is the point which I think comes in here.

Mr. DAY. I have that if you are interested. For enforcement under the $4½ million, 1956 program, $476,000; Post Office Department, for handling the stamps $169,000; development and maintenance of refuges, $2,220,000; land acquisition, $600,000; wildlife research, $185,000.

Mr. MILLER. How much for acquisition?

Mr. DAY. $600,000.

Mr. MILLER. For land acquisition?

Mr. DAY. That is right. Waterfowl management investigations, $375,000; river-basin studies in which we are attempting to secure more waterfowl refuges out of impoundments created by the Corps of Engineers and Bureau of Reclamation, $250,000.

Mr. MILLER. Does not part of that come from the Corps of Engineers, or is this $200,000 in addition to the money that you get from the Corps of Engineers?

Mr. DAY. In addition. This is for river-basin studies, to provide a staff to assist in going into the preliminary plans of the corps to see what land might be made available for waterfowl.

Mr. MILLER. Does the corps transfer to you certain funds for that purpose?

Mr. DAY. Some, but very little.

Mr. MILLER. The $200,000 here is not part of the funds transferred by the corps to you for that purpose? This is directly out of the bird-stamp funds?

Mr. DAY. It is in addition to what the corps transfers. The administrative service is allotted $225,000 which makes up the amount that we propose to spend in 1956 from that fund totaling $4,500,000.

Mr. MILLER. From that, about half is spent for investigations and scientific research?

Mr. DAY. About half is spent for operating and maintaining the refuges that we now have, $2,200,000. That is the big bulk, in fact. At the present time every waterfowl refuge in the United States depends for operation and maintenance upon duck-stamp funds.

Mr. MILLER. We maintain a few in California.

Mr. DAY. I should have said Federal refugees. Pardon me.

The CHAIRMAN. You are finished, Mr. Miller?

Mr. MILLER. Yes, Mr. Chairman.

The CHAIRMAN. Mr. Thompson.

Mr. THOMPSON. This is a very interesting schedule of disbursements. I wonder if it would be possible to have a similar schedule of receipts, showing the $11 million?

The CHAIRMAN. This program is going to be discussed. This is an overall explanation by Mr. Farley and Mr. Day of what we are going to further discuss. From day to day we will have the gentlemen here to discuss this in detail.

Mr. THOMPSON. Perhaps I did not make it clear, Mr. Chairman. I was speaking of the entire program, not only the migratory game account, but the entire account, the source of the revenues from the various accounts showing the statutory authority and the general details for the entire program.

Mr. DAY. I have that in detail.

The CHAIRMAN. We will get that from day to day.

Mr. THOMPSON. You have a schedule of everything here, and if we had a similar schedule of receipts, I thought it would be very helpful.

Mr. MILLER. That has to do with the things we have been asking, with service financing. This is the time when we are going to get service financing. I do not want to see some biologist being asked on the stand here as to how this money is broken down and have him say, "That is for somebody else." It is fine if Mr. Day can be present when these other people are on the stand and we can say, "Where is the money?"

The CHAIRMAN. I am very happy over the interest that the membership of the committee is showing, and I want you to go just as far as you like.

Mr. MILLER. I appreciate that.

The CHAIRMAN. You are asking that the table of disbursements be put in the record, and also at the same time, a table of receipts?

Mr. MILLER. The breakdown as Mr. Day has given it here and I think that we could serve notice on him now, with your permission, that in each of these special management funds we want the breakdown. I would like to see the accumulation since the law has been put into effect, the grand totals, because in some of these funds there is reported to be some money sitting in the Treasury that has not been sent out. I would like to discover what that is.

The CHAIRMAN. Mr. Day, you are scheduled for some questioning.

Mr. DAY. I am delighted, because when it comes to talking about taking money away I am glad to tell you of our needs.

Mr. MILLER. An effort was made to take some of this money some time ago and there was talk about taking some of this money accumulated over the last 20 years and tossing it into the general fund. This committee is not interested in doing that, and this is an opportunity to go into that.

Mr. DAY. I think I can sum it up in this fashion. The first four items, the $11 million sum is justified in great detail before the Appropriations Committee. We have our budget on that. I have a breakdown of individual items of where that goes. In general, all of the revenues from the first four columns on, beginning with the fifth, are transferred moneys or receipts, and without exception we budget our program in accordance with those receipts, with the exception of certain areas where we hold some in reserve for another year, as I mentioned, in the handling of the duck-stamp funds where we

keep a year's reserve. Our program is planned otherwise on expending all of the receipts from these various sources of income.

Mr. THOMPSON. Can we have for the record a similar schedule of receipts and distribution of those receipts in the same manner as the distribution of expenditures is displayed here? It will be very interesting and it is usually a counterpart of a schedule of disbursements.

Mr. DAY. This is a program made up on the basis of receipts and expenditures. There will be very little difference in any detailed statement from what you have here, but we can supply it here.

Mr. THOMPSON. Perhaps I am not clear on this, Mr. Chairman. Here you have a total schedule of expenditures proposed, totaling $43 million. Let us have a schedule of receipts from the agency, whether from sale of birds, or sale of duck stamps, and show source and distribution of these receipts. That would be the counterpart of this report, and it would be very interesting. It would show the statutory authority and the extent of these receipts.

Mr. DAY. We will get that for you, sir.

(The table referred to follows:)

TABLE NO. 2.—*Analysis of funds appropriated to Fish and Wildlife Service from special sources and applicability of such appropriations,*

TABLE NO. 2.—*Analysis of funds appropriated to Fish and Wildlife Service from special sources and applicability of such appropriations, related to fiscal year 1956 estimate of appropriations*

Source of receipts	Estimated receipts	Disposition of receipts	Estimated appropriation
(1) Net proceeds from sale of fur sealskins and other products of the Pribilof Islands.	$3,046,000	1 (*a*). For administration of the Pribilof Islands, including management and protection of fur seal herd and management of Pribilof community, 60 percent of proceeds.	$1,827,600
		1 (*b*). For management and investigation of fish and wildlife resources in Alaska, including construction, 25 percent of proceeds.	761,500
		1 (*c*). For deposit to Treasury of United States, remaining 15 percent	456,900
		Total	3,046,000
(2) Proceeds from the sale of wildlife refuge products (gross sales)	2,530,000	2 (*a*). For the expenses arising from such sales, amounts necessary to process sales, from gross sales.	30,000
		2 (*b*). Paid to States for schools and roads in the counties in which refuges are located, 25 percent of net after expenses for sales.	625,000
		2 (*c*). For refuge maintenance and enforcement activities, 75 percent of net after expenses for sales.	1,875,000
		Total	2,530,000
(3) Sale of migratory waterfowl hunting stamps (duck stamps)	4,500,000	3 (*a*). For the cost of printing, issuing, and accounting for stamps and for enforcement of the act, not to exceed 15 percent of receipts.	675,000
		3 (*b*). For acquisition, development, and maintenance of migratory waterfowl refuges, the remaining 85 percent of receipts.	3,825,000
		Total	4,500,000
(4) 10 percent excise tax on rods, creels, reels, and certain other sport fishing gear.	5,000,000	4 (*a*) For payments to States for fish restoration and management projects, 92 percent of tax.	[1] 4,782,900
		4 (*b*) For Federal administration of the grant-in-aid program, not to exceed 8 percent of the tax.	192,000
		4 (*c*) For use by the Service in research program on sport fisheries, reverted funds (funds apportioned to States, but not used by States within 2 years).	25,100
		Total	5,000,000
(5) Tax revenue from firearm, shell, and cartridge, etc., manufacture.	11,000,000	5 (*a*) For payments to States for wildlife restoration projects, 92 percent of tax	[1] 9,745,800
		5 (*b*) For Federal administration of the grant-in-aid program, not to exceed 8 percent of the tax.	539,200
		5 (*c*) For use by the Service to carry out provisions of the Migratory Bird Conservation Act, reverted funds (funds apportioned to the States, but not used by States within 2 years).	715,000
		Total	11,000,000
(6) 30 percent of gross receipts from customs receipts on fishery products.	4,207,826	(6) For use by the Service in research to promote free flow of domestically produced fishery products, to increase markets for such products and to conduct related research, not to exceed $3,000,000 in any 1 year.	3,000,000

[1] Adjusted for carryover balances between years.

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. I have one other question on the financial statement. I was trying to get from Mr. Farley some indication of the emphasis put on the various programs. This line 13 is the item of "General administrative services." It goes on for $760,000 within the first 4 columns and then continues on by program, $25,000 for the migratory birds, and so on. Does the amount of money spent for the general administrative services, as shown in that line, indicate somewhat the amount of what work and effort is put into these various programs by the Fish and Wildlife Service?

Mr. DAY. The $760,000 is appropriated by Congress to take care of the administrative overhead of the program which is financed from general funds, which is the $11½ million. In addition to that, assessments are made for administrative overhead against all of the other funds with a base of approximately 5 percent, with the exception of the Federal-aid programs, where the States carry on most of the administrative details, and the deduction is a lesser amount than the 5 percent.

Mr. ALLEN. What I was trying to get, for example, if that $225,000 goes into the migratory conservation account for general services against the total of about $1,462,000, would that indicate roughly that one-seventh of the effort of the Service is on the migratory bird conservation?

Mr. DAY. Well, on duck stamps, just roughly figuring here, I would say something more like 10 percent goes into it. The total cost of administration of fish and game laws, including some Alaska fisheries, is $3½ million. Comparing that with your total of $43 million of the total appropriations would be perhaps a little more than 10 percent.

Mr. ALLEN. Another way of going at the same question is a justification for the various amounts that are involved. How do you determine how much of the administrative expense you charge up against each of these programs?

Mr. DAY. Five percent, normally.

Mr. ALLEN. It is 5 percent as a blanket figure?

Mr. DAY. Yes.

Mr. ALLEN. Getting over to the promotion and development of fisheries where I think the figure is $150,000, would that indicate that 20 times that would be the total effort on the fisheries?

Mr. DAY. Yes; that is 5 percent of $3 million, which was budgeted.

Mr. ALLEN. Thank you.

Mr. FARLEY. Mr. Chairman, to correct that, that referred to only one phase of that. I think you are referring to the so-called Saltonstall-Kennedy Act fund of $3 million. That referred to the administration of that program. It does not cover the whole fishery program. In our annual budget we have the same type of fishery study.

Mr. ALLEN. These are programs divided financially?

Mr. FARLEY. They are both ways, sir. If you go to the bottom of the column in each category, you get the total amounts of money either available or expected to be available if appropriations or collections are made on schedule. If you follow the lines clear across from left to right and get the total on the right-hand side, that is the total that is being expended for the particular activities listed. So you have

some 15 items, I believe, listed. If you follow that all the way across, you will get the total on the administration of the different types of project.

Mr. ALLEN. The vertical lines are the segregation of funds for specific projects, and the horizontal gives the total programs?

Mr. FARLEY. The total funds that go into that particular activity are listed.

Mr. DAY. I could clear this up I believe if I could proceed briefly with a discussion of where these funds come from.

Another item in which special funds are made available is the receipts from refuges. Congress passed an act in 1935 giving the Service all receipts from refuges with the exception of 25 percent which goes to the local counties for the school and road funds and 75 percent to the Service. Those funds are made available on an indefinite basis. Then we get into the huge Federal-aid programs. The fishery program, authorized in 1950 and known as the Dingell-Johnson Act, sets aside the 10-percent excise tax on sport fishing tackle and amounts to a sizable sum each year. The older Federal Aid Wildlife Restoration Act, the Pittman-Robertson Act, brings in $10 million to $12 million a year and is also set aside as a special fund for distribution to the States.

Mr. MILLER. Mr. Chairman.

The CHAIRMAN. Mr. Miller.

Mr. MILLER. In connection with the Federal Aid in Wildlife Restoration, have you allocated to the States all of the money, with the exception of this $4,399,000 which you have as a cushion, that has been accumulated since the inception of that program?

Mr. DAY. Yes; it has all been allocated.

Mr. MILLER. Has it been given to the States?

Mr. DAY. Yes.

Mr. MILLER. There is no surplus money now in the Treasury awaiting allocation?

Mr. DAY. Mr. Farley reminds me that probably, Mr. Miller, what you are commenting upon is the fact that in the earlier years there were excesses of funds collected over the amounts that were appropriated. For a period of 5 or 6 years there accumulated some $13½ million which was not appropriated out and which is still in the Federal Treasury.

Mr. MILLER. Then all of the money collected under this money is not out? Your first statement was not correct.

Mr. DAY. I am sorry. My first statement was not correct. All of the moneys appropriated by the Congress have been allocated to the States, with the exception of a small overhead which we retain for administration, but the Congress has not yet appropriated some $13½ million of funds which were collected in the earlier stages of the program and which are still in the Federal Treasury.

Mr. MILLER. And which, in effect, morally belong to the States?

Mr. DAY. That is correct.

Mr. MILLER. Under the law they should go to the States?

Mr. DAY. That is correct.

Mr. THOMPSON. What would be required to make a distribution of these funds? Would a special act of Congress have to be passed, or do you now have that authority?

Mr. DAY. It will require a special act and there are before the Congress now several bills to instruct that these funds be made available.

Mr. THOMPSON. In the absence of passage of the special bills, would you have authority under any statute to make distribution to any extent of that $13 million?

Mr. DAY. The Fish and Wildlife Service could not do so. There are before the Congress as a means of instruction several bills proposing to dispose of this $13½ million, and to give it to the States.

The CHAIRMAN. And the Chair proposes to have those bills up within a reasonable length of time.

Mr. MILLER. And I suggest, Mr. Chairman, that a fiscal breakdown showing the moneys collected and disbursed and the history of this fund be inserted in the record at this place.

The CHAIRMAN. That can be prepared and put in the record at this point.

(The table referred to follows:)

Wildlife restoration excise tax collections, appropriations, and unappropriated balance

Fiscal year	Excise tax collections	Annual appropriations	Amounts not appropriated	Cumulative unappropriated balance
1939	$2, 976, 019. 80	$1, 000, 000. 00		
1940	3, 707, 843. 68	1, 500, 000. 00	$476, 019. 80	$476, 019. 80
1941	5, 535, 773. 25	2, 500, 000. 00	1, 207, 843. 68	1, 683, 863. 48
1942	5, 072, 587. 60	2, 750, 000. 00	2, 785, 773. 25	4, 469, 636. 73
1943	1, 149, 332. 58	1, 250, 000. 00	3, 822, 587. 60	8, 292, 224. 33
1944	1, 061, 044. 95	1, 000, 000. 00	149, 332. 58	8, 441, 556. 91
1945	3, 132, 402. 04	900, 000. 00	161, 044. 95	8, 602, 601. 86
1946	5, 232, 464. 71	1, 000, 000. 00	2, 132, 402. 04	10, 735, 003. 90
1947	9, 031, 273. 51	2, 500, 000. 00	2, 732, 464. 71	13, 467, 468. 61
1948	11, 276, 687. 37	9, 031, 273. 51	00. 00	13, 467, 468. 61
1949	10, 378, 538. 42	11, 276, 687. 37	(1)	(1)
1950	9, 351, 613. 60	10, 378, 538. 42		
1951	17, 846, 423. 75	9, 351, 613. 60		
1952	10, 679, 058. 77	17, 846, 423. 75		
1953	12, 147, 553. 88	10, 679, 058. 77		
1954	10, 266, 257. 56	12, 147, 553. 88		
1955		10, 266, 257. 56		
Total	118, 844, 875. 47	105, 377, 406. 86	13, 467, 468. 61	13, 467, 468. 61

[1] No change. Beginning with fiscal year 1948, the entire excise tax collections from the preceding year were appropriated for program use.

Mr. TUMULTY. Mr. Chairman, I would like to ask a question.

The CHAIRMAN. Yes, sir.

Mr. TUMULTY. This $13 million that is being held, to what States would this money go?

Mr. DAY. Every State.

Mr. TUMULTY. To all of the 48 States?

Mr. DAY. All of the 48 States.

Mr. TUMULTY. Was it collected pursuant to some formula distribution?

Mr. DAY. Yes. The Federal Aid Act provides that all of the revenues accruing from the excise tax on sporting arms and ammunition shall be set aside in a special fund and shall be apportioned to the States on the basis of the land area and the number of hunting-license holders in each State each year; so that it varies a bit from year to year; but every State has been in the program for almost 15 years, all are eligible, and all would participate in the money.

Mr. TUMULTY. The amount they would receive would be determined by the amount of revenue collected, is that it, from the sporting items?

Mr. DAY. No; the amount that they would get would depend upon the distribution of these moneys.

There are two philosophies on this distribution. One is to divide the $13½ million into equal additional appropriations over a period of 5 years. The other is to make it available immediately in a lump sum, giving the States an additional year to plan the expenditure of next year's revenues to avoid their running from hand to mouth each year as is done at present.

Mr. MILLER. Will the gentleman yield on that point because it is interesting?

Mr. TUMULTY. Yes.

Mr. MILLER. This is matching money to the States?

Mr. DAY. 25 percent State to 75 percent Federal.

Mr. MILLER. So that if the State legislature does not match the funds they then revert to the use of the Fish and Wildlife Service. This is an interesting thing, because, unless the Fish and Wildlife Service makes the determination of the amount of money available early enough, the State legislatures sometimes do not have opportunity to act and the money finds its way back to the Federal Treasury. That is an old story that Mr. Day very well knows and, as Mr. Farley knows, from his former station. Administrators also know all about that, is that right, Mr. Farley?

Mr. FARLEY. Yes, sir.

The CHAIRMAN. This is a matching proposal for the States to acquire refuges.

Mr. THOMPSON. That is a difficult program.

Mr. TUMULTY. If this money were to go back to the States, how would they expend that money? Would it have to be in line with the program?

Mr. DAY. It would have to be in line with the provisions of the basic Pittman-Robertson Act. These new bills will be up before the committee soon.

The CHAIRMAN. I want to ask you one question. Under this duck stamp, of all this money that you collect you allocate $476,000 for enforcement. Do you think that that is a sufficient and fair amount from that fund for the specific purpose? I am greatly interested in the enforcement, the preserving of what we have, and from personal observation I have seen a great lack in the field enforcement, having field representatives to let people know that we mean what we say about preserving these migratory birds. Do you think that you have enough field enforcement following the shooting season to properly protect birds, and I mean game wardens right out in the area?

Mr. DAY. No; I would agree with you, Mr. Chairman, that it is inadequate. We would like to have more enforcement officers. However, the amount that is expended from the duck-stamp moneys is fixed by law, and it was so fixed after a great deal of discussion as to whether there should be 25 percent available or whether there should be some other figure available. It formerly was 10 percent.

The CHAIRMAN. This amount is a percentage fixed by law from this fund?

Mr. DAY. That is right. We can spend only up to 15 percent for administration, which includes enforcement.

The CHAIRMAN. That administration covers such a vast area that it does not get to the field.

Mr. DAY. We spend everything we can up to 15 percent for enforcement including the $170,000 transferred to the Post Office Department for preparing and distributing the stamps.

The CHAIRMAN. Do you mean that enforcement is part of office administration?

Mr. DAY. That is part of the terminology of the act, but actually up to 15 percent is spent for enforcing the act.

The CHAIRMAN. Directly to men in the field to protect the birds?

Mr. DAY. And to the Post Office Department.

The CHAIRMAN. I do not think that you have enough game wardens. I think that a lot of your money is spent with good intentions in offices, but it just does not seem to me that that is the proper way to protect the birds. It is out in the field where the greatest return comes, in my opinion.

Mr. DAY. We are spending all we can legally spend under this duck-stamp act.

There is another large item of funds. That is the fund to develop and promote the fisheries.

The CHAIRMAN. You say that you think we ought to spend more, but that we are spending all that we can under the present law?

Mr. DAY. That is right; from the duck stamps.

The CHAIRMAN. It is the law itself which provides how it should be spent?

Mr. DAY. That is right, sir.

The CHAIRMAN. You do not think now that it is being allocated to the best interests and for the purpose for which it is being collected?

Mr. DAY. I would like to see a greater amount of money available for enforcement.

The CHAIRMAN. You would be agreeable then to an amendment to the act so that more money could be appropriated from these funds for enforcement?

Mr. DAY. The duck-stamp fund is actually a small fund, and when you start parceling it out, there is a real question as to whether more should be spent for enforcement or more for refuges. There is a very open question for debate. It was debated at great length before the act was amended to increase enforcement expenses from 10 percent to 15 percent. We are spending all of the 15 percent now for enforcement and for the Post Office Department. We are not charging any administrative services to that 15 percent. That is all we can do. If additional funds could be made available from general appropriations for enforcement, I would be very much in favor of it.

The CHAIRMAN. Proceed, sir.

Mr. DAY. One other large item is listed to "Promote and develop fisheries." That was an act passed in the last session of Congress which provides for an amount equal to 30 percent of the receipts from the customs duties on imported fishery products to be made available during each fiscal year. It is a 3-year program. That money is made available, as I say, from import duties and does not come out of the General Treasury. A great deal of that has been allocated out to promote fisheries.

Mr. TOLLEFSON. You have done no work on that, have you?

Mr. DAY. Yes; a program is started and will be discussed at a later date.

The other item is "Transfer of money from the Corps of Engineers," which totals $2,400,000, $1 million for operation and maintenance and the other $1,400,000 for construction of additional fish facilities on the Columbia River.

The CHAIRMAN. Do you take up this column "Federal aid to wildlife restoration"?

Mr. DAY. Yes, sir.

The CHAIRMAN. That is the Pittman-Robertson Act?

Mr. DAY. Yes.

Mr. MILLER. That is the one on which I asked for a breakdown. I think that that should show the money by States. We want a complete history.

Mr. DAY. We have a complete publication on that and will be glad to have it available when Federal aid comes in.

The CHAIRMAN. The column before that, Mr. Day, "Federal aid and fish management," that was what you got last year. You say you set up a program. What is the program?

Mr. DAY. Well, it is a wide, extensive program. It is going on in all of the States with various projects on fishery management, which will be discussed in detail later if you wish to wait until that time.

Mr. TOLLEFSON. That is the Dingell bill?

Mr. DAY. Dingell-Johnson was one and Pittman-Robertson the other.

The CHAIRMAN. All right, sir.

Mr. DAY. Going crosswise on the table under item 1, the administration of fish and game laws, we have lumped together there several sources of revenues. Those cover the enforcement of the Alaska fishing regulations, the Alaska game laws, the Migratory Bird Treaty and Lacey Acts, the Black Bass, the Bald Eagle, the Sockeye Salmon, the North Pacific Halibut Acts, the Whaling Treaty Act, and the Northwest Atlantic Fishery Convention.

All the enforcement problems of the Service are lumped under that item No. 1 which totals $3,506,500.

Mr. MILLER. That is where enforcement comes in.

Mr. DAY. All of the enforcement activities of the Service.

Item 2, propagation and distribution of food fishes covers the 87 fish hatcheries in 42 States, one of the oldest programs in the Service.

The CHAIRMAN. You have been reducing that considerably, have you?

Mr. DAY. Some of the old hatcheries have been taken out of production. A few have come in, but in general, the number of hatcheries has gone down.

The CHAIRMAN. Are you going to have that discussed?

Mr. DAY. Yes, that will be discussed in detail.

The CHAIRMAN. You say that you are building some new hatcheries and taking some out?

Mr. DAY. There were three new hatcheries built in recent years. There is none, I think, on the boards at the present time.

The CHAIRMAN. In what years?

Mr. DAY. Over the last 5 years: Millen, Ga.; Frankfort, Ky.; North Attleboro, Mass. There have been 4 or 5 that have come into the picture in the last 4 or 5 years. That will be reviewed.

The CHAIRMAN. Where are the ones that you discontinued?

Mr. DAY. I do not believe I have that handy, Mr. Bonner. It will be made available to you before the hearings are over.

The CHAIRMAN. I would like to have a memorandum on it for the record.

(The memorandums referred to follows:)

FEDERAL FISH HATCHERIES CLOSED DURING THE FISCAL YEARS OF 1950 TO 1954, INCLUSIVE

1950:
Boothbay Harbor, Maine
Fort Belvoir, Va.
1951: Elk River, Ala.
1952: Louisville, Ky.
1953: None
1954:
Gloucester, Mass.
Bourbon, Mo.
Edenton, N. C.
St. Angelo, Tex.

FEDERAL FISH HATCHERIES ESTABLISHED DURING THE FISCAL YEARS OF 1950 TO 1954, INCLUSIVE

1950: None
1951:
Millen, Ga.
North Attleboro, Mass.
Pendill's Creek, Mich.
Bald Hill Dam, N. Dak.
McNenny, S. Dak.
1952: Willard, Wash.
1953: Frankfort, Ky.
1954: None.

Mr. DAY. Under item 3, mammal and bird reservations, there are 275 national wildlife refuges, comprising approximately 17½ million acres; of which there are 205 refuges for waterfowl with some 3½ million acres.

Item 4 we have discussed, river basin studies.

Item 5 is the control of predatory animals and injurious rodents, largely in the West. That is an old program, going on since 1915 and the cooperating States and livestock people put in about $3.60 for each Federal dollar that goes into the program.

Mr. THOMPSON. Going back to the mammal and bird reservations, why is there a large difference between the 1956 estimate and the 1955 program? Is there any one reason for that?

Mr. DAY. Yes, the present fiscal program contemplates a greater use of duck stamp and other indefinite moneys rather than appropriations. So we have budgeted to take more and more money out of duck stamp and these indefinite appropriations to operate and maintain the refuges, and have thereby reduced the regular appropriations.

Mr. THOMPSON. Is this the total program, however, on maintenance of mammal and bird reservations, $6,773,830?

Mr. DAY. It was for 1955.

Mr. THOMPSON. Will the total amount available for 1956 be only $4,600,000?

Mr. DAY. That is right.

Mr. THOMPSON. What will you cut out of your program that will not endanger the effectiveness of these reservations?

Mr. DAY. Prior to this time, we have been operating and maintaining several waterfowl refuges on regular funds appropriated by the Congress. However, in the last two budgets those funds have been very much reduced and we have taken up the costs on duck stamp and other moneys. At the present time, this $876,000 covers the opera-

tion and maintenance of big-game refuges, refuges which we cannot finance from duck stamp money.

Mr. THOMPSON. The total program, however, shows a decrease of $2 million?

Mr. DAY. That is right.

Mr. THOMPSON. So you are going to spend $2 million less for total expenditures in 1956 than you did in 1955?

Mr. DAY. Yes.

Mr. THOMPSON. What big items are you cutting out?

Mr. DAY. Mostly improvements. Our refuges were run down after the war and we have been getting them back in shape with such things as expensive diking and improving buildings and fencing, and many things that go with a land program. This will be slowed down a great deal.

Mr. THOMPSON. How much of the six-million-some dollars for 1955 was spent for improvements? What is the level of actual management, exclusive of improvements?

Mr. DAY. Well, for 1955 we had budgeted for development and maintenance of refuges $4,203,000; for 1956 we have $2,220,000.

Mr. THOMPSON. Is that development and maintenance of the physical facilities or management?

Mr. DAY. It includes management, but it is building dikes, constructing trails, improving impoundments, fences—all of those things.

Mr. THOMPSON. What I am trying to get is this: Is the big difference due to construction that was done in 1955 and improvements that will not be done in 1956 or is there a cut in the actual management?

Mr. FARLEY. Mr. Chairman, I wonder if I could throw a little light on that. As of the previous year's budget, there was a backlog of development and improvement, of building dikes and ditches, and maintaining the refuges that were owned, but not completely developed. The Service was successful in persuading everybody that has control over these funds to release to us from the total moneys available from duck stamps and other sources a larger amount of money last year and it was an accelerated program. This year we feel that that accelerated rate cannot properly be kept up and that we should conserve and not dig any deeper into our duck-stamp money. You had discussed earlier that accumulation of unused duck-stamp money as a cushion between the years. So the program of necessity, to provide those cushions, was closed down and essentially the $2 million difference from last year is a slowing down on the improvement of refuges.

Mr. THOMPSON. This would not cut down your normally recurring management expenses?

Mr. FARLEY. No. We will not do as much development work, but it will continue to manage all those that we have.

Mr. THOMPSON. All right. Thank you.

Mr. DAY. Turning to item 7, "Research on fish and fisheries," it is largely in connection with commercial fisheries and covers studies of salmon, shad, marine fisheries, some of the red-tide studies on the gulf coast, North Atlantic trawl fisheries, aiding the International Commission for the Northwest Atlantic, Pacific oceanic fisheries, Gulf of Mexico shrimp, South Atlantic shrimp, and menhaden. It includes research on inland fisheries, improving fish cultural

methods, hatcheries, and so on, and also includes money to work on designs to fish in connection with Federal dams.

Item 8 is "Exploration," or commercial fishery activities in connection with exploring new areas, developing new types of gear to aid the industry, developing technological methods to improve methods of processing, and commercial fishery statistics. In general, that is our commercial fishery program.

Item 9 is "Research on birds and mammals."

Mr. ALLEN. Mr. Chairman.

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. Do you know the value of the total fishery production for the country during the year?

Mr. DAY. I would hesitate to give it. It will be available later.

Mr. ALLEN. Do you know approximately what percentage of the total value is represented in these two programs which go into, in a sense, the subsidy for the commercial production?

Mr. DAY. No; I do not have that, Mr. Allen. It will be available to you from later witnesses.

No. 9 is "Research on birds and mammals." That is our wildlife research program. There are various aspects of it in connection with agriculture and public lands and fur-bearing animals.

Item 10 is a special item of $150,000 for special research in connection with the Bonneville Dam of the Columbia River, attempting to find means of getting fish over the dams being built on the Columbia watershed.

Item 11 is "Construction and land acquisition," the completion or extension of fish hatcheries largely at Millen, Ga.; Frankfort, Ky.; Pittsford, Vt.; North Attleboro, Mass.; Cortland, N. Y., and Quilcene, Wash.

Item 12 is "Construction and land acquisition of wildlife facilities," which comes out of duck stamps. That is some additional land acquisition and additional construction, $1 million, with general administrative expenses as an item of $1,456,000.

Mr. MILLER. Does some of it not come out of the Pittman-Robertson funds?

Mr. DAY. No, sir. This is all Federal. The Pittman-Robertson program is for State areas.

Mr. MILLER. That does not show here.

Mr. DAY. This is all the Federal program. The Pittman-Robertson and Dingell-Johnson are appropriated to the Service and allocated to the States and any lands acquired are owned by the States.

I have already discussed the administration of the Pribilof Islands. That totals $1,931,000.

I discussed Pittman-Robertson and Dingell-Johnson Federal aid, $14,929,000.

We have deducted under item 16, "Administration of Federal aid," $631,200 as a deduction of only 3 percent for administrative purposes. The act authorizes 8 percent.

The CHAIRMAN. Line 15 relates to States. I notice that you have a fund that you pay landowners for destruction of crops by migratory fowl out of season. Where does that come in here?

Mr. DAY. Depredation expenses come either out of duck-stamp money or the refuge receipt money. Some may come out of general appropriations.

The CHAIRMAN. It is an interesting item because you taught the ducks and geese how to operate differently from what they operated 25 years ago. They are using the fields now, and they used to use the rivers and water. Now they go to the grain fields. How much are you setting aside, say on the Atlantic flyway for that purpose?

Mr. DAY. I would like to clarify my statement. We do not pay any landowners for any damages accruing from waterfowl depredations. Instead, we do assist them and work with them in demonstrating methods. We have been able to develop revolving lights and flares out in Congressman Miller's territory, and have secured surplus military aerial bombs and devices for frightening the birds, and we work with the landowners in attempting to reduce depredations; but in no instance have any of these moneys been used to pay a landowner for damage.

The CHAIRMAN. You let the field representative, the game warden, have this money?

Mr. DAY. That is right; to aid the farmers in preventing depredations.

The CHAIRMAN. Are you increasing the amount to them to carry on this work?

Mr. DAY. I think they have all they need.

The CHAIRMAN. There has been a great complaint coming to me along this line. That is the reason I am raising the question.

Mr. DAY. We have depredations by blackbirds in some areas which we have not been able to control. Normally with waterfowl it can be handled.

The CHAIRMAN. From where does that fund come?

Mr. DAY. Either from regular appropriations, from duck stamps, or from refuge receipts.

The CHAIRMAN. You will have someone to discuss that?

Mr. DAY. That is right; later.

Mr. THOMPSON. What is the procedure for a landowner to acquire the assistance of your Department in protecting his pastures or grain fields?

Mr. DAY. Normally to get in touch with the State game warden or get in touch with the Federal game warden direct. We try to work very closely with the landowners on those things.

Mr. THOMPSON. We have quite a problem on that, you know.

Mr. DAY. Hurrying through this, Nos. 18 and 19 are the "Lower Columbia fishery program." Those are funds transferred by the Corps of Engineers for protecting the fisheries.

Item 20 is "Payments to counties in lieu of taxes." That is 25 percent of all the revenues that come from refuge appropriations.

The last item is the matter again of reserve. Item 21 is one of the reserves that we carry on.

In addition to the items shown on this sheet, which is the total Service program, the Fish and Wildlife Service also participates in all of the international fishery treaties. There are seven of those. Expenses in the amount of $425,000 are budgeted to the State Department. That is to carry the expenses of the international commissions. It is not directly a concern of the Service except that the Director and Assistant Director serve on all of the international commissions and it is a very closely integrated part of our total operations. I

have added that as an item of interest as to the international fishery picture.

Mr. TOLLEFSON. Mr. Farley, were you going to discuss items 5, 6, and 7 on your sheet, "Foreign activities and interstate compacts," or do you feel that you have covered that?

Mr. FARLEY. We have not covered them, sir, but I yield to the wish of the members of the committee as to whether to incorporate those into a more abbreviated discussion or to discuss them on a future date.

The CHAIRMAN. Have we finished with Mr. Day? Are there any further questions to ask?

We will recess until tomorrow, gentlemen.

Mr. FARLEY. We will reschedule those, sir, with the rest of the program.

The CHAIRMAN. We will have to do that, Mr. Farley. It is a compliment to you that the committee is so interested in your subject and they take more time than you think they are going to take. We will have to go from day to day and move the program down.

Mr. Allen?

Mr. ALLEN. May I ask Mr. Farley one question? With regard to this $13 million of funds that will be apportioned to the States, do you have any opinion as to whether, if the whole amount were apportioned at one time or made available at one time, the State legislatures would have difficulty in matching the funds in a single year?

Mr. FARLEY. That has been stated in some cases, sir. I do not have enough information to know just how serious that question is. It has been a problem in some cases.

Mr. ALLEN. Would it be possible theoretically to pile up a sufficient amount so that when the States were called upon to match it they would have to forfeit by reason of inability to get their own appropriation?

Mr. FARLEY. I expect that it is possible.

Mr. TUMULTY. Mr. Farley, would the amount going to any individual State be considerable? Would the amount of this $13 million to which Mr. Allen alluded, if distributed back to the States, be a considerable amount in the case of any one State?

Mr. FARLEY. There were two approaches originally. One was to have the same distribution as Dingell-Johnson, 25 percent matching money; and there were other approaches where there was no matching money.

Mr. TUMULTY. Would it be better to keep the money for the use of the Bureau in the Federal Government? Is there any thought along those lines?

Mr. FARLEY. Most of the discussions, because of the original purpose of collecting it, have been around the idea of a distribution to the States, and I have heard no discussion with the general thought of making it available to the Federal Government.

The CHAIRMAN. We have bills dealing with the subject and will have you up here at that time.

The committee will stand adjourned until tomorrow morning at 10 o'clock.

(Whereupon, at 12:05 p. m., the committee was adjourned to reconvene at 10 a. m. on Thursday, March 3, 1955.)

STUDY OF THE OPERATIONS OF THE FISH AND WILDLIFE SERVICE

THURSDAY, MARCH 3, 1955

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D. C.

The committee met at 10 a. m., pursuant to recess, in room 219, Old House Office Building, Hon. Herbert C. Bonner (chairman) presiding.

The CHAIRMAN. The committee will come to order.

The first witness this morning will be Mr. Swift.

STATEMENT OF ERNEST F. SWIFT, ASSISTANT DIRECTOR, FISH AND WILDLIFE SERVICE

The CHAIRMAN. Mr. Swift, will you give your full name? I would like for you to put your background in the record, please.

Mr. SWIFT. Mr. Chairman, my name is Ernest F. Swift. At the present time I am one of the Assistant Directors of the Fish and Wildlife Service. I was previously a director from the Wisconsin Conservation Department prior to my coming to the Fish and Wildlife Service.

Mr. VAN PELT. How long were you director of that?

Mr. SWIFT. I was director a little over 7 years, Mr. Van Pelt. I was with the Service there for 28 years.

Mr. VAN PELT. And you did a fine job.

Mr. SWIFT. Thank you. Shall I proceed, Mr. Bonner?

The CHAIRMAN. Yes.

Mr. SWIFT. Mr. Chairman, the Director of the Fish and Wildlife Service, Mr. Farley, is meeting with the Secretary of the Interior and will not be present. The schedule that was outlined for execution this morning is on wildlife research, game management, and wildlife refuges.

Wildlife research and game management will be discussed by Dr. Linduska, and the wildlife refuges by Mr. Clark Salyer.

At the time that Dr. Linduska gets into the matter of regulation, with your permission I would like to discuss the part that the States play in developing migratory waterfowl regulation.

That is about all I have to say at this time, Mr. Chairman, and I would like to introduce Dr. Linduska to proceed right into the agenda.

The CHAIRMAN. Are you going to discuss the procedure that is carried out in setting up the migratory waterfowl regulation in the various States and districts?

Mr. SWIFT. Not the biological part of it, but how we coordinate the State efforts with that of the Federal Government, Mr. Bonner.

The CHAIRMAN. Who is going to discuss the regulation as to taking the migratory waterfowl?

Mr. SWIFT. Dr. Linduska, Mr. Bonner. Gentlemen, this is Dr. Linduska.

STATEMENT OF DR. JOSEPH P. LINDUSKA, CHIEF, BRANCH OF GAME MANAGEMENT, FISH AND WILDLIFE SERVICE

The CHAIRMAN. Doctor, would you give your full name and your background, please? I would like the record to show the background of each witness.

Dr. LINDUSKA. Chairman Bonner and members of the committee, my name is Joseph P. Linduska. I am Chief of the Branch of Game Management of the Fish and Wildlife Service, and also at the moment Acting Chief of the Branch of Wildlife Research.

I came to the Fish and Wildlife Service in 1947. Prior to that time I was employed by the Michigan Conservation Department; and before that by the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture. I am a native of Montana.

It is a pleasure to outline for this committee some of the activities of the Fish and Wildlife Service as they are represented in the branches of Game Management and Wildlife Research. I assume that my early appearance before this committee follows the rather logical sequence of events that lead up to any operating program wherein you have your research preceding and laying the groundwork and basis for your operating program.

I might preface any further remarks by saying that the Branch of Wildlife Research in the Fish and Wildlife Service is one of its smaller branches. Our annual operating budget runs about a million dollars a year. We have 145 full-time employees, most of them, of course, being of highly technical caliber.

In the course of the next day or two you will hear from a number of the operating branches and from their reports I am sure that you will appreciate the complexity of the Fish and Wildlife Service operations and the great variety of subject matter with which it is concerned and for which it is responsible.

I think possibly I can emphasize the importance and the responsibilities of the Branch of Wildlife Research best by saying that it is the one research branch that provides the background information for all of these operating branches that are dealing with wildlife affairs. A separate research branch, of course, is concerned with the fisheries aspect of the services program.

Georgraphically our spread is very appreciable. It extends from Alaska to Florida and from the State of Maine into California. I would like to take up very briefly some of our Alaskan operations, particularly the matter of fur seals where I think research has provided an especially valuable function.

The United States Government got into the fur-seal business in 1867 when they acquired Alaska. With Alaska they obtained the Pribilof Islands and the Aleutian chain. The Pribilofs are a group

of small islands lying about 300 miles south and west of the Alaskan mainland and a little north of the Aleutian chain. In the Pribilof group of islands there are two, St. Paul and St. George, which are important and well known for being the breeding grounds of the Alaskan fur seal. The islands were discovered in 1786 by a Russian explorer, Pribilof. They also, I might mention, lie in the Bering Sea.

Prior to the acquisition of Alaska and the Pribilofs, the Russians exploited the fur-seal herd rather sharply. The estimated size of the herd at the time the islands were discovered was placed at about 2½ million. By the time the islands were acquired by the United States the herd had declined to about 1 million.

If the stewardship of the Russians was bad, I guess the early guardianship of our country was not too much better. In 1868, the first year that our Government had ownership of the islands, we took off a quarter of a million fur seals, and they were exploited to somewhat that same degree over the next 45 years or more until the herd reached an alarming level of about 150,000 animals.

I might say that part of that very sharp reduction was due to procedure of harvest. The animals were taken pelagically; that is, on open waters, and in those situations it obviously was hard to distinguish sexes and they took them indiscriminately.

The overall condition of the herd reached an alarming degree and in 1911 our Government negotiated with Canada and Japan for a treaty to give very much needed protection to the fur seals, and one of the highlights—and I think most beneficial from a management standpoint—of the treaty concerned this matter of pelagic sealing.

A research program was begun a few years after the treaty in about 1912 or 1913. Obviously, one of the first and most pressing needs was for some substantial way of keeping track of the animals, of censusing them, and it has proven to be a difficult problem although I am satisfied that at the present we have good means for keeping track of the year-to-year prosperity of the fur seals and know pretty much about what the herd contains at any one time.

I think you can appreciate that, particularly when you realize that the animals, part of their time, are in the water where they do all of their feeding. Other times, of course, are spent on land when they are in the process of replenishing their kind.

As a result of the research that laid the basis for subsequent management, the herd has regained its former numbers, almost to the point of saturation. We believe that that herd now numbers between 1½ and 2 million.

The overall operation has been placed on pretty much the same basis as what we could expect of a well-run Hereford farm. A great many of the male sex are so many drones as far as the biological requirements of the herd are concerned, so that our operations call for taking only 3- and 4-year-old males, leaving the older bulls which have harems to provide the reproductive function.

As a general average over the past few years, the take has run about 60,000 to 70,000 animals. The average income has run in the neighborhood of $80 to $90 a skin. So it does represent a substantial source of revenue to the Government.

One thing that has been noted in connection with the fur seal is the matter of losses from natural causes. At the low period of their

number along in 1910, 1911, and up through 1915, we knew that the animals were infected with a parasite that occasionally killed off numerous pups. It did not seem to affect the older animals. At that time such counts as were recorded showed that about 5 percent of the pup crop was being lost to this roundworm or hookworm. As the herd has multiplied and reached an apparent point of carrying capacity for the area the losses have increased to about 15 percent of the pup herd, and that is a rather substantial figure.

That, I might add, is one of our main points of interest and main objectives of research at the moment; to find out just what can be done about reducing those losses from hookworm infestation.

Normally in wild animals we can't hold forth too much hope for doing much about parasitism because it is so difficult to treat them or manipulate the environment in ways that will relieve the cause. However, because of the confined circumstances in which the fur seals exist on these 2 small islands in the Pribilofs, 1 of about 25 square miles and another about 35 square miles, I think it is quite within reason that we may be able, by some means through a program of sanitation and possibly with the use of some of our new and potent chemicals, to clean up and sterilize the shoreline to eliminate that source of recurring infestation. If that can be done, of course, it will be extremely beneficial in the light of future management of the herd.

Another rather fabulous animal that occurs in the same area and of which I have placed on the table a few examples of the pelts, is the sea otter.

The sea otter's history runs parallel with that of the fur seal except to say that if the fur seal was overutilized and exploited, we can say that is doubly true of the sea otter.

We have records of shipments numbering up to 15,000 animals, single shipments going into Siberian ports in the early 1800's.

The animals consistently brought an amazing price. Even at that early day when a dollar was a lot of money these animals brought as much as $500 a skin, and in one of these shipments that I speak of the overall return to the boat and its crew was over $1 million.

This little animal also occurred on the Pribilof Islands; the same concentration area that I mentioned for the fur seal.

The islands, as I mentioned, were discovered in 1786, and in that year of discovery there were 5,000 of these sea otters taken off the Pribilof Islands.

In the succeeding 6 years following the date of discovery the animal was exterminated on the Pribilofs, never again to reappear. It reached a state of practical elimination in the late 1800's and at least three expeditions aimed at locating, if possible, any remnants of the sea otter herd failed to produce a single animal at periodic intervals in the early 1900's.

We know that a great bit of the Alaska coastline, the Pribilofs, the Aleutian chain were, at one time, extremely productive of these animals. We know, also, of course, that a great many of these once-inhabited areas are now devoid of any of the animals. So one of our first programs in connection with restoration of the sea otter will center around an attempted reintroduction of these animals into once formerly occupied habitats.

We have plans underway this year to take by live trapping animals from the Aleutian chain, islands where they are currently abundant, and transferring them to the Pribilofs, the area which they once occupied in rather substantial numbers.

I think that is about all the comment that I would have at the moment on sea otters.

As you can see, they have an exquisite pelt. At one time they were the fur of royalty. The Chinese mandarins especially valued them, and that was one of the main outlets for the fur crop.

The CHAIRMAN. What is the population at the present time?

Dr. LINDUSKA. At the present time it is a little hard to determine exactly, but between two and three thousand animals probably.

I might say that these have been under protection since about 1911. The fur is at present contraband wherever it is found, so that they have the tightest possible type of protection.

We have noticed that in some of these nucleus herds they have not distributed themselves as you would expect, and neither have they grown beyond a certain point, and we feel that some nuclei of this population have probably reached a saturation point; so we should be in the clear to live-trap animals out of those areas and take them into areas that we know at one time were productive of the species.

Mr. BARTLETT. Did they suffer some kind of animal disaster within the last year or two?

Dr. LINDUSKA. There have been periodic die-offs. We have not been able to determine what it is. They have some of the same afflictions that seem to be common to the fur seal, but we have been unable to determine precisely the cause of losses. It is true that we have located and seen some evidence of loss.

I might say that in the process of moving the animals aren't susceptible to handling too much. We have lost some in the ordinary process of trying to transport them. I think you are familiar with the newspaper accounts of the experience of the National Zoo in attempting to bring a few in for exhibition. They managed to get them to Washington safely, but they died shortly thereafter.

I mentioned briefly the losses among fur seals which leads me to another program of the Branch of Research in the Fish and Wildlife Service concerning wildlife diseases.

In particular I would like to spend a little time on botulism, which is a scourge of waterfowl that periodically reaches alarming proportions. It probably has existed for a great many years although it wasn't until 1910, to be exact, that the disease really came to public attention, and in fact forced the attention of conservation people around the country to the problem.

In 1910 in the Bear River marshes lying just north of the Great Salt Lake, we have one of the finest waterfowl areas in our entire refuge system, and I am sure that Mr. Salyer will be spending some time on that. This particular incident that I will mention predates the acquisition of that area for refuge purposes, although I do expect that the condition probably provided part of the basis at least for acquiring the area as a Federal refuge.

In 1910 botulism appeared in the Bear River area and in a short period of a month or 6 weeks killed over a half million ducks.

Mr. BOYKIN. What killed them?

Dr. LINDUSKA. This disease of botulism.

That prompted some beginning investigations in 1911 and 1912. They found that the disease occurred sporadically, and in a number of the Western States it would appear in considerable proportions one year and be entirely absent the next.

One thing that the outbreaks seemed to have in common was an association with alkaline waters and I think it was a natural and logical assumption for the first investigators to assume that they were dealing with a toxic type poison that had, as its source, some of the chemicals in these alkaline lakes; so that early in the evolution of studies the disease first came to be known as alkali poisoning. It was also generally known as western duck sickness because of its apparent confinement to the Western States.

It was not until several years later that a fairly intensive job of research developed the true nature of the disease and it was found that rather than being a chemical poisoning it was due to a bacterial organism, and it is a variety of the very common organism that humans knew so well before the days of pressure cookers and vacuum packing.

I think we all recall that before the days of commercial packing it was common in the homes to do your own canning, and the recommendation was always made to be sure to boil your beans and corn because of the danger of food poisoning. It was a pretty rough poison. Commonly, people that got enough of this toxin to have symptoms were pretty well on the way downhill before much could be done about it.

This botulism bug that works on waterfowl is essentially the same type of problem. The bacteria is unique in that it requires the absence of oxygen to live, whereas most bacteria, of course, require the presence of oxygen. It feeds, not on living tissue, but on dead tissue, and it is not the bacteria that causes the loss of waterfowl, or formerly caused the loss of humans, but a toxin that the bacteria produce.

I think you gentlemen can appreciate that there is probably nothing that resists restraint and provides a more difficult research subject than a wild duck. As soon as you place him under confinement you have immediately created artificial conditions that jeopardizes your experiment so that it has been extremely difficult to follow through and reach any final answers on botulism.

The amazing thing is that in spite of our present great lack of knowledge about botulism we have been able to do quite a bit about it. We have noticed that botulism outbreaks are invariably associated with certain types of conditions. They are conditions that, as I mentioned previously, are most prevalent on western lakes which are of shallow depth, of accumulations of mud, of wave action that makes the shoreline fluctuate over a distance in many cases of 50 or 100 or more feet; and without knowing precisely how the organism is reproduced and not knowing at the moment whether it is reproduced in decaying vegetable matter or inside the bodies of the little organisms that live in water, we know that when you get a particular type of shoreline with particular types of water conditions and temperature that you can expect trouble from botulism.

So wherever we have been able to manipulate water levels we have been able to do some good as far as botulism is concerned.

I might mention further that Bear River, one of the greatest hotbeds of botulism in the entire country, following its acquisition as a refuge was developed in ways that permit such a treatment of water tables to prevent and mitigate the effects of this botulism organism.

Mostly those concern drawdowns to take the water away from these areas that are botulism hotbeds, or, if it is possible to flood deeply, you can accomplish the same thing; but the manipulation of water is our present main approach to the solution of botulism.

The botulism program exemplifies for me a very desirable trend that is more noticeable, I think, these days in Government wherein several Government agencies are working at an intensively cooperative level to satisfy a common objective. In the case of botulism we enjoy the finest possible cooperation from the United States Public Health Service. Obviously, those people are specialists in epidemiology and disease of all sorts.

This thing has some human aspects and applications that encourage them to want to know more about the problem. They have facilities that we in the Fish and Wildlife Service could never hope to duplicate, kinds of equipment that are beyond our means and types of manpower to run them that we could never hope to employ on a year-round continuous basis; so we have been able through cooperative effort with the Public Health Service to apportion out to those people certain segments of the problem for their attention.

It has proven to be a happy situation and one that has been mutually profitable.

Another disease problem that the chairman is quite familiar with and one that again has been an aggravation in terms of not being able to pinpoint just what might be done about it and what the actual cause is is the loss of geese on Pea Island, Mr. Bonner. Pea Island is a little barrier reef that is located somewhat south of Norfolk and in the little chain of sand islands just north of Cape Hatteras. It is an extremely important wintering area for the Canada goose in the Atlantic flyway.

Normally the numbers of geese on that small island run about 10,000. For some reason there has been not an alarming but an abnormal loss of geese in that particular locality. Oddly enough in Back Bay refuge just to the north of there and other concentration areas to the south and west we have not noticed that type of loss. There is something obviously peculiar about that Pea Island setup that is encouraging losses particularly from parasitism.

The principal parasite involved is the gizzard worm. As the name implies it is a round worm that inhabits the gizzard, and apparently mainly through mechanical action, but also through a digestive process on the part of the worm, the lining of the gizzard becomes eroded so that it loses its function as a digestive or grinding organ. The animals begin to lose weight; as they become less thrifty the parasites become more numerous and losses occur. Beyond that there is some indication that it may be a combined effect of parasitism and something in the way of nutritional values of the feed on Pea Island.

Just what form the final solution might take I do not know. It is possible that through some manipulation of the habitat, production of greater and newer quantities of feed, we can bring some solution

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to it, but the animals arrive there in the same condition as they do on concentration areas to the north and south and at the moment the best we can say is that it is the conditions they find after their arrival that finally develop the problem.

Somewhat related to the problem of diseases, in that they operate somewhat in the same way, is the matter of chemical poisons, which to us in the Fish and Wildlife Service is becoming somewhat more of a problem each year.

I have particular reference to insecticides. I think all of you can appreciate and recall that during the past war there were some rather notable discoveries in the insecticide field. DDT was the one that enjoyed the greatest popularity and later proved to be one of the most versatile of the chemical discoveries. The record achieved in terms of malaria control and typhus control was outstanding. But the release of some of those materials to the public naturally was accompanied by a considerable apprehension on the part of the public. They were known to be extremely potent and the question naturally arose: What is this going to do when it is applied to cornfields for corn borer control, to our woodlands for control of various insects, to potatoes for control of insects; if it is so toxic to insects, what is it going to do to our wildlife?"

At that point we began a modest investigation involving mostly one man which happened to be me. That was the time I came with the Service, partly I imagine for my combination of experience in the field of wildlife and insect control.

We found that, while there were real hazards to the use of DDT, there was in most cases a margin of safety that would keep us out of trouble, providing the information could be properly disseminated and that control people could be encouraged to keep their control within those safe limits.

Some of our earlier experiments involved amounts of 5 pounds per acre, which is not much. Still the loss of birdlife with that dosage of 5 pounds per acre was amazing.

At the Beltsville Research Center, the research center for the Department of Agriculture, we treated one woodland area of about 100-some acres with 5 pounds per acre and intensive censuses before and after that operation showed that 90 percent of our birds had been killed off. We knew that 5 pounds was unreasonable. We worked from that point until we found that a pound per acre applied by plane did not have any great effect on the birds so that we were able to guide the Forest Service of the Department of Agriculture in a great many of their extensive operations involving forest insect control, and they have had operations involving in excess of 100,000 acres.

I think all in all that research on insecticides has been extremely effective in keeping us out of trouble.

In spite of that there are new chemicals being produced almost every day that are a far greater concern than DDT ever was. Some of them are 75 to 100 times as toxic as is DDT. One of them is of such toxicity that it prompted a representative of the Food and Drug Administration to remark that if a man were unfortunate enough to splash one drop in his eye it would kill him before he could wash it out. That was not an exaggeration or loose talk—he is obviously a thoroughly competent and informed toxicologist and that was a statement of fact.

One material has come to our attention recently, and again the chairman will be interested in this because one of the reports comes from his state of North Carolina from Clyde Patton the Director. There is an insect that extends from here on down through the southeast, the white fringed beetle, which is a considerable nuisance. One stage of its life history is in the soil as a grub. One of the most effective approaches of control is to control the grub in the soil. They have tried a new material known as dieldrin in the control of that insect and within the last couple of weeks Clyde Patton wrote us a rather excited letter telling that within one area where this has been used it killed every vestige of life on the area.

The carcasses were gathered and taken to North Carolina State College and they found substantial quantities of this material in the tissues of all the animals brought in.

About the same time we received from Dr. Harlow Mills, Chief of the Illinois National History Survey, a similar report involving 3,000 acres. I might mention that in the case mentioned by Patton it was applied at 4 pounds per acre which is a lot, but you need a lot in creating a toxic condition in soil. The incident in Illinois was 3 pounds per acre over 3,000 acres. It was applied for Japanese beetles. The report from Dr. Mills was essentially the same as we got from Patton. Everything had been killed out.

Beyond that there had been no reinvasion of the area which is remarkable because we in the Wildlife business certainly appreciate the old saw that nature abhors a vacuum and we find that you can eliminate a great many animals by poisoning or trapping or shooting and the natural reaction is that reproduction occurs rapidly.

In this case there has been no reinvasion and no repopulation following one reproductive season of the wildlife species common to that area. That brings us to still another problem investigated to some degree by our Patuxent research endeavor.

I might say that this chemical dieldrin in tests out there against quail was shown to be chronically toxic. That is, where you feed repeatedly. I think that is a good experiment because that approximates conditions in the wild. These animals in the areas are going to feed over a period of several months or as long as they happen to be there. This particular experiment showed that five one-thousands of 1 percent, that is 5 parts in 10 million will kill quail in 60 days. Larger amounts killed them more quickly, of course, until you got to amounts that would kill them acutely. That is an infinitesimal amount of chemical to have that effect.

An even more amazing result of some of these studies I think concerns the passing on to progeny some weakness that come about following the exposure of the adults to this insecticide. I will outline briefly another experiment in which the adult birds about the time they started to breed were fed one one-thousandths of 1 percent, one part in 100,000 of this material for a few weeks before they bred.

They were compared with a control group fed a normal diet. Both the experimental and control groups laid the same number of eggs. The amount of fertility was the same in both groups. However, when it came to hatching time, whereas 82 percent of the control group hatched and survived—that is, for the short period—only 41 percent of the experimental group hatched out. At the end of 12 weeks, 78

percent of the control group on the insecticide-free diet and only 32 percent of the contaminated group survived.

Keep in mind that this involves chicks that were raised in the incubator and never exposed in any way to the chemical. It is some weakness that was transmitted through the adults which had been exposed. That to us, gentlemen, is a rather disturbing situation.

At the moment this particular chemical dieldrin is not being used in a widespread fashion but because it is a good insect control agent the expectation is that it will be used more widely.

I might mention that we have one man trying to follow up on this and it is rather hopeless to have all the answers in connection with not only this insecticide but a great many more that are coming out. It is what we feel is a rather important research endeavor.

The CHAIRMAN. Is this the chemical that is used for the Japanese beetle?

Dr. LINDUSKA. They use a great many. DDT has been used rather widely. This is a new one that is apparently quite superior to anything that has been used heretofore.

The CHAIRMAN. It is used for that purpose?

Dr. LINDUSKA. That is correct.

The CHAIRMAN. On farms?

Dr. LINDUSKA. That is correct.

I might mention that the white fringed beetle particularly apparently finds conditions for its life most acceptable in edge environments between the edge of a woodlot and along fence rows. That is exactly the type of an area that your wildlife like.

The CHAIRMAN. What is the name of this chemical?

Dr. LINDUSKA. It is extremely involved. It is very long.

The CHAIRMAN. What trade mark is used?

Dr. LINDUSKA. Dieldrin. It is a product of Shell Oil Co., as I recall.

The CHAIRMAN. Generally, do other commercial products have this same drug in them?

Dr. LINDUSKA. No; this one is a patented material, and I do not know that others have precisely the same one, but there are a great many variations of this chemical.

The CHAIRMAN. This is the one that you found most deadly to quail when used on the ground?

Dr. LINDUSKA. That is right. This one I picked out simply because it is one that has come to our attention within the last few weeks. I might say that there are at least 50 or maybe 100 others that would fall more or less in this same category.

Mr. BOYKIN. May I ask a question?

What could you do to not have them use this material? Do you think it pays to use it?

Dr. LINDUSKA. There is not too much that we can do about it, Congressman Boykin, as far as I know. This takes place on private lands. I do not know to what extent either the State or we, as a Federal agency, have responsibility and authority over this particular type of situation.

Mr. BOYKIN. Do you think the people would use it if they knew it was going to kill the animals? What is it that they are trying to kill, the worms in the ground?

Dr. LINDUSKA. That is right. Of course they are faced with a rather concrete problem of making a living on the one hand and producing wildlife on the other, and it has been unhappily my experience that this business of making a living on the land has pretty high priority and as much as the farmer enjoys and appreciates wildlife, in terms of his farming practices and other requirements of making a living, he is inclined to put that in the background a little bit.

Mr. BOYKIN. Does it help his land?

Dr. LINDUSKA. It destroys this white-fringed beetle which is a considerable pest.

Mr. BOYKIN. But it destroys everything else, too?

Dr. LINDUSKA. That is right. We notice it in a situation such as an orchard area where they are controlling moths with DDT. In those areas we knew that the requirements for control of the coddling moths were so extensive that it would destroy birdlife including game species in some areas. The program went on nevertheless. They were going to get those apples off worm free if they could.

Mr. BOYKIN. We use a lot of DDT at home on the soybeans and potatoes, and it has never given us any trouble.

Dr. LINDUSKA. Not any extensive trouble. I do know that the combination of DDT and other chemicals used for cotton boll-weevil control has in conditions of rainfall washed downstream and killed appreciable numbers of fish. It is not at least as dramatic in its effects as some of these new materials.

Mr. CHASE. Doctor, how is that generally applied? Is it by surface application?

Dr. LINDUSKA. Yes; and they are applying it in this particular case in the form of granules because it will withstand weathering somewhat longer. It is purely a matter of poisoning the soil. You stir it in about like you would fertilizer.

The CHAIRMAN. That is the same chemical that they spray with airplanes?

Dr. LINDUSKA. I do not know that this one has been sprayed from airplanes, sir. I know that that is a common method of using DDT and benzine hexachloride and many others, but I do not know of an instance where this has been sprayed by plane.

I would like to move on to another problem that is reaching appreciable dimensions with the Fish and Wildlife Service. That concerns the matter of wildlife depredations. The Service of course is responsible in various directions for migratory birds. Unhappily some species occasionally get into people's hair in a fairly concrete sort of way. Blackbird concentrations, particularly where they appear in rice-production areas or in truck-crop areas, can create a good bit of damage.

Just as a suggestion of what a good blackbird concentration looks like, I have brought a photograph along. You might like to pass that around. That was a roosting flock that was stirred up about dusk.

Mr. BOYKIN. How many do you figure was in that flock?

Dr. LINDUSKA. The overall concentration was estimated to include several million. I think they made a rough guess that probably 50,000 were getting up here, but in that overall area where this concentration occurred there were several million.

As I mentioned as far as blackbirds are concerned this problem particularly concerns the Southeast in the tristate area of Arkansas, Mis-

sissippi, and Louisiana, where we have a good bit of rice production.

The entire problem of not only blackbirds but waterfowl I think is a logical development which you would expect from increasing human populations and increasing requirements for more intensive uses of the land. Many of these problem areas were formerly wintering and concentration areas for migratory birds.

A man comes in and drains and otherwise manages that land for his purposes. Agriculture of course is the main purpose. It brings birds and agriculture together under circumstances that to me at least appear inevitable.

One of the real stickers in these depredation problems as far as migratory birds are concerned is this: Very often the problem is one that is developed by a group of birds today that may be 2 States south of there tomorrow, and it may further be confined to a period of a week or 2 weeks and the birds that you control today are quite some distance from here tomorrow.

Some of our banding work has shown that rather dramatically. In the Southeast, as I mentioned, we banded blackbirds and found that birds that were contributing to that problem came from 27 States and 4 or 5 Provinces so that in order to give any relief through control operations you would have to in effect control your populations nationwide and the same is true in some degree to these concentrations as they appear elsewhere. I am not going to take time to go into that further. As I say, it is a problem that is reaching considerable dimensions.

Our main concern at the moment is a type of research that would aim to avoid the problem rather than trying to solve it through control because we see no good end to that. For one thing there is no individual species of bird that is all bad. Most of them have desirable attributes as well as these periodic harms that they bring about.

Waterfowl is another one that gets us into the same trouble occasionally, California being a particular hotspot where we have a pileup of as many as 5 million ducks during part of the year. There, again, I am certain that the final solution is going to come through an intensive program of land acquisition providing us with a place to put the birds since we have taken away their former winter grounds, putting them into rice production.

Mr. BOYKIN. Do you have any idea of where would be a good place to put them?

Dr. LINDUSKA. In terms of land acquisition?

Mr. BOYKIN. Yes.

Dr. LINDUSKA. I am sure Mr. Salyer will have a good bit to say about that. I would like to reserve that for his comments.

I mentioned that the branch of research in the Service is employing a cooperative approach to many of their problems with the best of effects. I might mention briefly a few programs that go beyond the normal cooperative participation that we enjoy in a good many of our operations. One concerns a program of cooperative units. This program was developed about 1935. At the time it was aimed at producing technical personnel who could take a more prominent part in the administration of both Federal and State game affairs. It was to provide technical assistance to the States in many of their game problems and in addition to that to bring about an element of public

education that was sorely needed at that time and still is, as a matter of fact.

We have 16 of these cooperative units. They are supported jointly by the Fish and Wildlife Service, the State conservation department, the State college or university at a land-grant university setup, and the Wildlife Management Institute, a private nonprofit organization with headquarters here in Washington which is a third cooperator contributing $1,000 a year to each of the units. They have put over a half million dollars into the program within the last 20 years. The Service's contribution is in the form of a cooperative unit leader and his salary. The university provides $6,000 which may be written off in terms of office space and clerical assistance, and the conservation department normally makes their contribution in cash and it is used for fellowships in these schools. The program has been an extremely popular one. It has been profitable, I think, both from the State and Federal standpoint, and does represent a high level of cooperative endeavor between the States and Federal Government.

The CHAIRMAN. What do they do?

Dr. LINDUSKA. It is a combination research and training program. I might mention that within the last 20 years they have produced 1,700 graduates of a highly technical degree. Thirteen hundred of those were graduated with bachelors' degrees in wildlife management, 400 with higher degrees of masters or Ph. D. That training program is one important aspect of it.

As a result very largely of that program a great many of the present State conservation directors and technical personnel in the States are former cooperative unit products. That training has been one feature of it and research both by the unit leader and by the graduate students that he supervises has been another outgrowth of it.

Mr. RAY. May I ask a question?

The CHAIRMAN. Yes.

Mr. RAY. How many of that 1,700 are still in the Service or in the services of the States?

Dr. LINDUSKA. A very high percentage, but I could not tell you offhand. We have that figure. We keep track of them and find out where they are going and what they are doing.

Mr. RAY. I would be interested to know how large a proportion make this a career.

Mr. LINDUSKA. A very large percentage, but I do not recall the figures offhand. It is over 90 percent.

Mr. RAY. Would you get that for the record?

Dr. LINDUSKA. Yes, sir; I will be glad to.

(The information referred to above follows:)

EMPLOYMENT STATUS OF COOPERATIVE WILDLIFE RESEARCH UNIT SCHOOL GRADUATES

To date (1954), 2,187 wildlife students have graduated from the 17 unit schools since the establishment of the respective units: these include 1,581 with bachelors' degrees, 545 with masters' degrees, and 61 with doctoral degrees.

Of these graduates approximately 68, 88, and 90 percent, respectively, obtained employment in the wildlife field or returned to school for further training. During recent years about one-fourth of the students have been taken into the military services immediately upon graduating. Many of these men will be available for wildlife employment when they return to civilian life.

The percentage of graduates remaining in the wildlife work is unknown but certainly, at least insofar as those with advanced degrees are concerned, the majority are still actively engaged in the field. Many of the earlier graduates have advanced to key positions. Among these are the directors of 7 State game and fish departments, a dozen Federal-aid coordinators within the States, 3 assistant regional directors in the United States Fish and Wildlife Service, 5 cooperative wildlife research unit leaders, the coordinator of the nationwide cooperative wildlife research unit program for the Service, and at least 27 biologists engaged in college teaching in wildlife and related fields.

COOPERATIVE WILDLIFE RESEARCH UNIT STATISTICS, 1954

Wildlife graduates of the unit schools

The number of fish and wildlife students graduating from the cooperative wildlife research unit schools during the 1953–54 school year declined for the fourth consecutive year.

School year	Number of degrees granted			Total
	Bachelors	Masters	Doctors	
1949–50	251	48	8	307
1950–51	178	66	5	249
1951–52	159	78	8	245
1952–53	164	50	7	221
1953–54	131	65	6	202
Total	883	307	34	1,224

Sixty of the seventy-one students who received advanced degrees had obtained financial assistance in the form of fellowships, scholarships, and/or field expenses from the cooperative units. In addition, approximately one-fifth of the bachelors degree students had received some support or had used unit equipment as undergraduates.

Our records indicate that 2,187 wildlife students have graduated from the 17 unit schools since the establishment of the respective units, including 1,581 with bachelors degrees, 545 with masters degrees, and 61 with doctoral degrees. Many of the older graduates have advanced to key positions in the conservation field. Among these are the directors of 7 State game and fish departments, a dozen Federal-aid coordinators within the States, 3 assistant regional directors in the Fish and Wildlife Service, 5 unit leaders and the unit coordinator for the Service, and at least 27 biologists engaged in college teaching in wildlife and related fields.

Employment status of the graduates

Of last year's (1953–54) graduates, 48, 5, and 1 (37 percent, 8 percent and 17 percent, respectively) of those receiving bachelors, masters, and doctoral degrees went into the military service. This accounts for a total of 27 percent of the graduates as compared with 24 and 13 percent for 1953 and 1952.

Twenty-one (16 percent) of the bachelors degree graduates and 10 (15 percent) of the masters degree graduates returned to school for further training, accounting for another 15 percent of the total 1953–54 graduates.

Of the remaining 62 bachelors, 50 masters, and 5 doctoral graduates, 56, 82, and 80 percent, respectively, obtained wildlife jobs, 2 of the Ph. D.'s in wildlife teaching.

Employment was distributed as follows: with State and provincial conservation departments, 78.3 percent; Federal conservation agencies, 10 percent; private agencies or individuals, 8.3 percent; and, with teaching institutions, 3.4 percent.

Job status and type of jobs held by the graduates are indicated below:

Job status and types of fields entered	Number of graduates		
	Bachelors	Masters	Doctors
Game research	3	13	1
Game management	14	15	
Fish research	5	4	1
Fish management	5	3	
Both game and fish research and/or management	1		
Law enforcement	4	1	
Public relations	3	4	
Teaching fish and wildlife courses			2
Museum specimen collector		1	
Returning to school for advanced training	21	10	
Teaching courses unrelated to fish and wildlife	3	2	1
Military service	48	6	1
Unknown or nonwildlife jobs	24	6	
Total	131	65	6

PUBLICATIONS AND REPORTS

An important objective of the cooperative wildlife research unit program is the dissemination of research findings through the publication of research findings through the publication and distribution of reports, bulletins, circulars, books and journal articles. During the calendar year 1954 a total of 129 publications excluding quarterly reports, newspaper articles, etc. emanated from the units. This figure is based upon listings in the quarterly progress reports and should be considered tentative; there may have been some omissions. However, our records indicate that since the establishment of the respective units approximately 2,175 papers by staff members and students have been published on numerous topics. These have had widespread distribution.

RESEARCH

Conducting research for the improvement of wildlife management programs is one of the primary objectives of the unit program. To provide the cooperating agencies with information as it becomes available, processed reports are distributed to them quarterly by each unit. These reports are also exchanged among the respective units so that research workers may keep posted on the research activities in other States.

As a matter of convenience for those who have not read these reports, we have listed here, by project title and name of the investigator, projects that were conducted during calendar year 1954. Projects marked by an asterisk were completed during the year; the others were incomplete or still active at the end of December 1954. Projects initiated since January 1, 1955, are not included.

In the interest of better coordination of the research projects and to provide a means of quickly determining which units are working on what species or problems, a general subject matter index is also appended. A comparison of the number of projects listed for the various units does not necessarily indicate the relative amount or quality of research being conducted at the unit schools; nor does the list necessarily portray where the major efforts of the respective units have been placed in the past.

Although most of the projects are financed out of regular unit funds, some are financed by the colleges and universities, the State conservation departments, the Wildlife Management Institute, the Fish and Wildlife Service, from additional funds made available for specific projects, or by State and national wildlife federations or by students on their own resources.

Fishery projects are financed primarily by State funds contributed over and above the amounts designated as minimum for regular unit operations. Generally, college staff members personally conduct or supervise the fishery projects; both unit leaders and college faculty members supervise the other projects and do personal research.

Mr. BOYKIN. It would be a fine thing even if they did not stay with the Service if they would help to do it on their own land. The people can do more to help game. People that love it, and own it and have

these game preserves do more than anyone else. We are glad to have the Federal Government's help. I am training some of my boys to be foresters. If they love that kind of thing and study it, they are apt to work on it with some organization.

Dr. LINDUSKA. I will hurry along. I would like to mention in lining up our research program that a great deal of our administration and direction of the research program takes place out of two laboratories, one in Denver, Colo., and the other at the Patuxent research center which I mentioned.

Each of these laboratories covers much of the field of activity that I have mentioned here. This Patuxent laboratory is just a short drive from Washington—25 miles. It is unique in that it is about the only setup of that sort, an installation dedicated to research on wildlife and only research, and I would like to extent to you gentlemen, individually and as a group, an invitation to come out and look us over out there. I am sure that you would be interested, and we would appreciate your comments.

The CHAIRMAN. What is the area of the Patuxent laboratory?

Dr. LINDUSKA. Twenty-six hundred acres.

Mr. BOYKIN. We really ought to see that. Are you out there?

Dr. LINDUSKA. Yes; it is in connection with the agricultural research center.

Mr. BOYKIN. Do you know I. T. Quinn?

Dr. LINDUSKA. Very well.

Mr. BOYKIN. He used to be our State director. He is a splendid gentleman.

Dr. LINDUSKA. Yes.

That does not cover our entire field of research activities, but I think it demonstrates the variety of the things we are concerned with and the type of problem prominent in present-day research administration.

I would like to hurry to game management and review that. The branch of game management in the Service is a regulatory and enforcement body for the service. It also within recent years has been playing an increasingly prominent role in what you might call a pick-and-shovel-type biology. They have been taking a prominent part in some of our service and the type of activity that provides a basis for regulations. I think that is wholesome because when an enforcement man has some idea of how regulations are developed he is in a better position to understand the need for those regulations. We have 120 field agents in the United States and 24 in Alaska.

The CHAIRMAN. What is a field agent?

Dr. LINDUSKA. They are GS–7 and GS–9 agents.

The CHAIRMAN. What does he do?

Dr. LINDUSKA. Primarily enforcement.

The CHAIRMAN. We generally speak of him as a game warden?

Dr. LINDUSKA. Yes.

The CHAIRMAN. How many do you have?

Dr. LINDUSKA. One hundred and twenty.

Mr. BOYKIN. How many in Alaska?

Dr. LINDUSKA. Twenty-four in Alaska.

Mr. BOYKIN. Can the 24 cover it in Alaska?

Dr. LINDUSKA. Not in the way that it should be covered, sir.

Mr. BOYKIN. They have a good man representing them here.

Mr. BARTLETT. We need more.

Dr. LINDUSKA. Well, as to the Territory of Alaska, I am sure that a brief glance at the map to see the size of it and knowing what the trend up there is in the way of increase in population and knowing that the natural history resources are one of the great Alaskan values, I am sure the 24 is not sufficient.

We have a supervisor and one assistant in each of the regional branches. That may appear to be heavy on supervision, but the truth is that both the supervisor and assistant take a prominent part in actual field enforcement. We like to think of our supervisory responsibilities there as being more than plain supervisory and contributing a great deal in the direction of training aspects on the job, so that both of those men travel a great deal. They accompany our agents for extended periods. They actually enter into enforcement operations with them. They are not strictly armchair supervisors.

The CHAIRMAN. You say you have 120 game wardens throughout the United States and 24 in Alaska. On an average, that would be about 3 to a State?

Dr. LINDUSKA. On an average, that is correct. Our distribution is not equal between States. Every State has 1; most States have 2, but a number of States have 3 or 4 or more.

The CHAIRMAN. I do not think you are paying enough attention to this point. I do not think you have enough of what we know as game wardens to protect this wildlife. I am very interested in all these other problems which you have, and I know that Alaska is a vast area, and 24 for Alaska and 120 for the balance of the United States would be really less than 3 for each State, if you apportioned them out. I just feel that this is an area in your management in which something should be done. I think that a lot of things go to paper work and office work right out in the field.

Do you shift wardens to let them follow the game as it moves?

Dr. LINDUSKA. Yes, sir; we do that. They are a very mobile force. We move them here, there, and elsewhere, as the problem requires it, even to the extent of sending them to Alaska to assist on enforcement there during critical periods, and to the Canadian North to help on some of our inventory and survey work.

They are moved around a great bit. Still, I will acknowledge your question that it is an inadequate force. All I can say is that it is the fullest possible force we can accomplish with the funds at hand.

Mr. VAN PELT. What cooperation do you get from the State enforcement officers?

Dr. LINDUSKA. We would be in bad shape if it were not for the support of the States in this enforcement program. We have as deputy Federal agents something in the neighborhood of about 2,000. Practically every State warden is deputized and has a commission to enforce Federal regulations. Without that we would be in terrible shape. They do a good job, on the whole. It varies, as you would expect, between States, but on the whole it is a pretty good program and they do a pretty good job.

Mr. VAN PELT. Do you also have men that are sworn in as deputies that are not on the regular salary?

Dr. LINDUSKA. We have a very limited number of them. I would like to emphasize one thing: The State employee receives no Federal salary. He is paid purely by the State. We have a very few indi-

viduals who have no immediate connection with a governmental agency, State or Federal, who also carry commissions. At one time we used that procedure somewhat more freely, and very often now we get suggestions that we could help augment our regular enforcement staff through a more liberal use of that procedure.

Unfortunately, our experiences were not all happy ones when we did that. Enforcement is a rather specialized field, and there is a great responsibility that goes with it, and unless a man has some specialized training in the business the opportunities of getting himself in trouble and you in trouble are appreciable.

So we have not gone to the average sportsman even though many of them are interested and willing to help out by being deputized.

The mere fact that our regulations are complex and the knowledge of enforcement procedure is rather great, has caused us not to employ that procedure.

Mr. RAY. What would be your attitude as to adequate number?

Dr. LINDUSKA. We have thought on and off in terms of 200 to 250. Even with that it would not be a force adequate to perform the job alone. We would still have to lean very heavily on State personnel to do a good bit of the job. There are areas where we feel we are now understaffed and could use more of our own agents.

I think the problem is growing because the hunting public is growing. Competition for hunting access and the birds themselves is getting greater each year, so that the need for additional enforcement is felt both on the State side and Federal.

Mr. RAY. You need a little more than double what you have now?

Dr. LINDUSKA. I would say about double.

Are there any further comments on that particular aspect of it?

I would like to mention that these Federal agents have, as one of their responsibilities the enforcement of 14 Federal acts and statutes including some in commercial fisheries, and of course the main one, the Migratory Bird Treaty Act, being the one to occupy the major amount of their time.

I have mentioned that our agents are not distributed equitably. We have them concentrated in some States, and that concerns partly partly the size of the State and secondly the importance of a given State or area as a concentration area for both hunters and waterfowl. Those are factors taken into account in the distribution of our agents.

About the caliber of our agents I would like, without being immodest, to say that I am satisfied that our Federal law-enforcement group is the finest of its kind in the country. Certainly it is the finest dealing with conservation affairs and I would rank them highly with the enforcement groups of any kind. They are specialists in this field.

We use as a source of recruitment, State agents, but they are handpicked and represent the cream of the crop. Our 120, I think are absolutely tops. Within recent years we have become more and more cognizant of the possibility of the agent doing a great deal more than straight enforcement. He is the man in the field whom the public meets most often. He is the contact man for the Branch, for the Service, and even for the Department.

We have looked for higher standards in terms of background, formal education, in selecting our people, because of the tremendous potentialities they have in the direction of public education.

We also find that we can employ them very effectively during the summer and spring periods in helping out on some of our semi-technical operations, these surveys; so that, while we have an extremely competent force, I think we are improving upon the caliber of the individual agents and the overall operation every day.

The CHAIRMAN. Does their compensation come out of the general appropriation or special funds like the shotgun tax?

Dr. LINDUSKA. We have several sources of revenue, Mr. Chairman.

The CHAIRMAN. The reason I asked that was yesterday when we reached that portion of this chart I was interested to find out that of all this money, there was only $476,000 of this $4,500,000 of the Migratory Conservation Act for enforcement, whereas for some other items there was $2,200,000.

I want to ask you how you came to designate the breakdown of this fund? You were here when Mr. Day testified?

Dr. LINDUSKA. Yes, that is our so-called duck-stamp money, Mr. Chairman.

The CHAIRMAN. The breakdown is fixed by law?

Dr. LINDUSKA. As far as law enforcement is concerned, 15 percent is what we are permitted by congressional authorization to use.

The CHAIRMAN. That is all.

Dr. LINDUSKA. I might say that even that represents an improvement over what it was a few years ago. We were getting 10 percent up to a few years ago and by congressional act it was changed to 15.

I would like to hurry over another phase of game management operations. That concerns a semitechnical operation.

In addition to doing the spadework on developing regulations of course, and of course the big job of enforcement of regulations, we are also the branch that has a primary responsibility for obtaining the basic information which leads to the development of regulations. That is a sizable program. It involves particularly an annual survey of waterfowl conditions in the North.

Here again we employ all competent members of our staff to help out on it. We have about 12 technical people involved in that operation. Most of them are pilots. The survey of those northern breeding grounds is primarily an aerial operation.

The Canadian duck-breeding Provinces have been laid off in strata depending on the intensity of nesting, and following the advice of statistical experts and some of our statistical staff we have set forth a statistical method of sampling the waterfowl prosperity and numbers each year.

As I say, most of the operation is a flying one. The Provinces are laid off in transects and waterfowl are counted in a way that permits the information to be analyzed statistically and gives us an annual check on both the breeding birds in there and on the success that those breeding birds meet in any 1 year. That information provides the main basis for establishing our hunting regulations.

The CHAIRMAN. That is the shooting regulations on the various flights?

Dr. LINDUSKA. That is right.

The CHAIRMAN. And the conditions under which you can shoot them?

Dr. LINDUSKA. That is correct.

The CHAIRMAN. Take, for instance, on the Atlantic flight. Are the conditions with respect to baiting uniform up and down the coast?

Dr. LINDUSKA. The regulation, yes; is uniform. It is a national regulation and applies not only on the Atlantic flyway, but to all 48 States.

I would say that as far as Federal enforcement is concerned it is still a uniform and uniformly enforced regulation. As far as some of the individual State interpretations of that regulation are concerned, there is some difference.

The CHAIRMAN. Is there some provision where we participate with the State with respect to funds that the Government collects and issues back to the States? Do the States have to go along with the Federal regulation to receive these funds?

Dr. LINDUSKA. That is correct, the so-called Federal Aid in Wildlife Restoration Act.

The CHAIRMAN. How do the States get away from this proposition and have various privileges with respect to baiting and other things? They could be cut off from their funds, could they not?

Dr. LINDUSKA. I am not prepared to answer that.

The CHAIRMAN. I have become sort of a conservationist myself. Nevertheless, I want to have for the people that want to hunt down in my area the same regulations as the man north and south of them. I do not want my area to be restricted to a certain distance from bait or some other area permitted a lesser distance from bait. There are such things going on.

Dr. LINDUSKA. That is correct, in part.

The CHAIRMAN. I want to know whether we are going to continue to cooperate with the States that do not meet your regulations and still issue out these funds?

Dr. LINDUSKA. I can say with fair certainty that there is nothing in the so-called Pittman-Robertson Act that would permit that type of action. It is based mainly on the substantial nature of the projects that are submitted, and if they are consistent with these various provisions of the act, that in itself is qualifying evidence.

The CHAIRMAN. If you have a State that does not cooperate with the regulations you lay down with respect to migratory waterfowl you can cut off their funds; can you not?

Dr. LINDUSKA. I rather doubt that we can.

The CHAIRMAN. Under these special funds that are raised here?

Mr. FARLEY. Mr. Chairman, can I add a little to that?

STATEMENT OF JOHN L. FARLEY, DIRECTOR, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR—Resumed

The CHAIRMAN. Yes.

Mr. FARLEY. The present act under which those funds are distributed requires, first of all, that the projects submitted be conservation projects. The other requirement is that their State laws are such that they cannot use moneys derived from the sale of fishing or hunting licenses for other purposes than conservation purposes.

In other words, they cannot collect the license money for hunting licenses and buy a recreation area or use it for some other purpose. It must be restricted to the use of the game department of that State.

Other than those restrictions I do not think we have any leeway in withholding funds.

The CHAIRMAN. Certainly these funds go to the States for the operation of their State departments?

Mr. FARLEY. On projects approved by the Federal Government.

The CHAIRMAN. Just on the projects and not on the management?

Mr. FARLEY. They may develop a management program in connection with, say, land purchase.

The CHAIRMAN. On their enforcement projects?

Mr. FARLEY. The enforcement as such to my recollection, no; but we will have the supervisor of that activity here another day and he will answer that specifically.

The CHAIRMAN. Let us get down to facts. Over in Maryland you have one regulation and the State has another; is that correct?

Mr. FARLEY. There is a difference; yes, sir. The State provides on baiting 200 yards. The Federal regulation at present recognizes no specific distance.

The CHAIRMAN. What do you do to get that State to conform with other States?

Mr. FARLEY. There is nothing that we can do in the way of pressure or withholding of funds to do that.

The CHAIRMAN. I do not mean pressure, but they have a State department of conservation. Do they not cooperate with you and you with them?

Mr. FARLEY. Normally we have had some areas of differences in enforcement procedures during this last year.

The CHAIRMAN. In respect of migratory fowl, do certain Federal laws supersede the straight laws under the treaty act?

Mr. FARLEY. The State cannot make a more liberal interpretation than the Federal regulations specify, sir.

The CHAIRMAN. Are they not doing this?

Mr. FARLEY. They can refrain from enforcing religiously the Federal regulations if they so desire.

The CHAIRMAN. If you go in and enforce, you can successfully prosecute?

Mr. FARLEY. Yes, sir; we can and do.

Mr. MILLER. Would not a solution be that, if you had a group of wardens in any State that wanted to do that, you could throw a group of your wardens in and there would be nothing to prevent you from making arrests?

Mr. FARLEY. That, sir, is exactly what happened in Maryland this year when there was a relaxation by the Maryland authorities.

Mr. MILLER. You take them directly to the Federal court?

Mr. FARLEY. That could be done. In this particular case, sir, we feel so deeply that to make this migratory waterfowl program successful we must have State cooperation—and we have had a splendid degree of that all through—that we tried to approach the particular emergency that existed in Maryland without making it too difficult to get Maryland back in the fold of 100 percent cooperation. So we tried to rumple as few feathers as possible, but still carry out the provisions.

The CHAIRMAN. The Governor cooperated with you?

Mr. FARLEY. Yes, sir.

The CHAIRMAN. I can understand your problem. I just wanted to take this opportunity to let Maryland and others know that this committee is interested in the difficulty that arose over this.

Mr. FARLEY. I think that is a very fine help.

The CHAIRMAN. The proof of it is that game is getting scarcer and it is another way of taking more game. I know that.

Mr. FARLEY. I might say, Mr. Chairman, that we have had no criticism of the work that was done in Maryland except in 1 or 2 cases that it was unfortunate that the cases were dealt with so lightly, and that we should have taken them to Federal courts.

The CHAIRMAN. Down in my State you take them to Federal court.

Mr. FARLEY. That was part of this planned-out program to not force a Federal program to the point where it would be objectionable to the State people, and that we would find it very difficult in another year to iron out our differences and again get together on a coordinated program.

The CHAIRMAN. You have let them know that next year you will take them to Federal court?

Mr. FARLEY. We have not announced it.

The CHAIRMAN. You take them to the Federal court in my State. You put it right to them.

Mr. FARLEY. We didn't wish to appear to be a Federal agency browbeating a State agency into doing something.

The CHAIRMAN. I am not criticizing you for taking them into Federal court in my State, but, if you do that, I want you to do it in other States. I think it would be a healthy thing if your Department would announce where you have problems of this kind, because you break down the cooperation that you have somewhere else. I am interested and am not criticizing.

Mr. RAY. Should we not have this in the record, the list of the States?

The CHAIRMAN. A list of the States that are cooperating?

Mr. RAY. Where there has been a lack of cooperation.

The CHAIRMAN. What States are there in addition to Maryland?

Mr. FARLEY. Perhaps I could have Dr. Linduska answer that. That is the outstanding one that came to my attention in the last few months.

The CHAIRMAN. It is near us and we saw it because we get the papers.

TESTIMONY OF DR. JOSEPH P. LINDUSKA, CHIEF, BRANCH OF GAME MANAGEMENT, FISH AND WILDLIFE SERVICE—Resumed

Dr. LINDUSKA. By way of explanation, Mr. Chairman, I would like to say that the apparent variation toward regulations does not involve the regulation itself, but rather the interpretation that is made of the regulation and the vigor with which the regulation is enforced.

We have no State, including Maryland, where you have a State regulation that is in contradiction to Federal regulations unless it happens to be more restrictive.

I want to clarify this one point particularly. The Maryland regulation is actually more restrictive than the Fish and Wildlife regulation. The difference comes in the enforcement of the regulation.

If a State were to pass a regulation that is contradictory to the Federal in the direction of being more liberal, I am sure that there are processes of law that could be employed to correct that situation. The State could be enjoined for having such a regulation.

Most States, in their State game code, have actually written into their code that as far as Federal regulations are concerned they adopt Federal regulations as written. In other words, they do not rewrite them.

In Maryland they have in effect two regulations. One says that it is illegal to take birds that have been lured or attracted to bait, period. That is exactly what ours said. That is probably a hazardous contraction of the thing, but in effect that is what it says. That is what the Federal regulation says also.

In addition the Maryland regulation says that it will be unlawful to hunt birds within 200 yards of feed. That removes the lure and attraction element. A man caught shooting within 200 yards of feed is accepted as prima facie evidence that he is in violation of the regulation.

The difference comes, as I say, in the field enforcement of those regulations. When you come to the matter of variations in the vigor with which a regulation is enforced then it would be awfully hard to say what States are doing a very good job and which ones are doing nothing or a very poor job. You have individuals involved. You cannot always attribute it to the attitude of the Department. It may be that they have a rather poor and indifferent force. It may not necessarily reflect the officials' viewpoint at all, and I would hesitate to say what States are doing an awfully good job. Most of them are, I am happy to say. Others are not doing too good a job, but whether or not it is because of type of agent that is disinterested—maybe he is underpaid, maybe he is going to have a job today and not one tomorrow—I do not know.

Mr. BOYKIN. Mr. Chairman?

The CHAIRMAN. Mr. Boykin.

Mr. BOYKIN. Do you not think that all of the States look on the Federal enforcement as a kind of big brother and go to them for advice? In Alabama we have over 100 game wardens, and the Service has 1, but we go to him for advice.

I think you will find these slip-ups where somebody will not do it. They do look up to the Service, I think, and try to cooperate and I would say 95 percent do that in my State.

Dr. LINDUSKA. I was discussing very briefly the procedures whereby we obtain the type of basic information that provides the backdrop and the basis for our annual regulation.

I say we have a small nucleus staff of technical people whose primary function is the organization and direction of these field activities, but our game agents, because they can be employed during the summer months without interfering with their enforcement activities particularly in the southeastern fringe of States, are brought into the program quite prominently. We have also a substantial banding program in Canada.

I might mention that one of the greatest needs at the moment is an adequate program of banding waterfowl so that we can distinguish flyways as to the source of their birds. At the moment, for instance

in the Province of Saskatchewan, supposing we had a bumper crop of birds: just how much of that favorable effect in Saskatchewan can we assign to the Pacific flyway, how much to the Mississippi and to the Central, and so on? We have no means of determining that at the moment.

We know as far as the Mississippi and Central are concerned that the substantial part of the Saskatchewan-produced birds go through those two flyways. That is briefly one of the main needs at the moment.

I am happy to say that in that program here again we enjoy a high measure of cooperation. For instance, last year out of a total of 44 people involved in such a banding program, 12 were Fish and Wildlife Service employees; 12 were members of the Canadian Wildlife Service; 22 of them, an even half, were State employees who went there and participated in a program, and we had 1 man each from a Province, 1 from Ducks Unlimited, and 1 from the Wildlife Management Institute, the same organization that I mentioned as being an interested and heavy contributor to our cooperative unit program.

In addition to that intensive job of breeding-ground work we conduct an annual hunter-kill survey which is pretty much at the present time in the exploratory stages. We are feeling our way on the thing. It is a statistically designed program that we are hopeful will give us reliable information on what the individual hunter is getting in the way of ducks, and figures on crippling loss and items of that sort. It is badly needed for interpretation of our regulation.

In addition we have an annual winter survey, cooperative in the extreme. Last year, out of a total of 1,800 that took part, 1,500 were State employees. One hundred planes were involved in flying a total of 67,000 miles. In the flying program we have been fortunate in getting the Coast Guard, Army, Navy, and Air Force to coordinate some of their training flights with this particular survey need, so we have been able to kill 2 birds with 1 stone and get a lot of flying done that we normally wouldn't.

Those figures are also used as a part of the consideration in developing regulations. As to the development of those, we are in the process of evolving a procedure that Mr. Swift is going to discuss with you. It centers around the flyway councils, so-called, which are organizations of State directors.

If you have no further need for me I will refer this to Mr. Swift.

The CHAIRMAN. I have one question. Mr. Boykin?

Mr. BOYKIN. I think you made a wonderful statement. You understand your subject.

The CHAIRMAN. Often we are asked with respect to the hunting season, could it be changed to the extent of dropping a week or 10 days at the forepart of the season and adding it on to the latter part? How would interested people have an opportunity to discuss that with those who determine the seasons? You have 3 or 4 hunting seasons up and down the coast.

Dr. LINDUSKA. Yes.

The CHAIRMAN. Is that your subject or does that fall to somebody else?

Dr. LINDUSKA. No; that falls within this program.

The CHAIRMAN. You start on the Atlantic coast. How many different sections of hunting seasons do you have?

Dr. LINDUSKA. Last year in the Atlantic flyway we had a season 60 days long. Any given State could have selected a season 60 days in length or 2 separate seasons with a 10-percent, roughly a 6-day, penalty. They could have had 2 periods of 27 days each. They could have hunted within a framework of dates beginning on October 1 and running through January 10.

In other words, in States where it is advantageous to hunt early, say north of New York, New England, they obviously would have begun their hunting on October 1 and hunted for 55 consecutive days; or, as I say, they could have taken this split season and hunted 26 days beginning October 1 and picked up the rest later on. Most of them began on October 1 and went for 55 straight days. That is true of the northern tier of States generally across the country.

The CHAIRMAN. They have two shooting seasons?

Dr. LINDUSKA. They can select the option of a split season, but there is a 10-percent penalty with it.

In the Southern States they are interested in hunting as late as they can. They normally pick the tail date of January 10 and come forward.

The CHAIRMAN. There is no way they can continue after January 10?

Dr. LINDUSKA. Not within last year's regulation. The framework of dates October 1 to January 10 is flexible. They are not fixed by any particular requirement that cannot be changed.

The CHAIRMAN. If no one else is going to ask a question about it, I am asking why is January 10 the limit on which you can come into this new year?

Dr. LINDUSKA. That is a date that has been liberalized through the years. It is based primarily on this consideration, Mr. Chairman:

When you get to the southern tier of States you are getting to the wintering grounds of our waterfowl. They are vulnerable in that type of situation. We know that the later you go into the season, February and March, the more vulnerable they become. The whole thing is relative. So that January 10 to us represents some liberalization over January 1. The later you go the more birds you expect to kill.

Mr. MILLER. It is a biological problem?

Dr. LINDUSKA. That is right.

Mr. MILLER. The determining factor is the life habit of the bird. Theoretically that is what you try to shoot for.

Dr. LINDUSKA. It is biological to the extent that anything later than along in January becomes of increasing importance from the standpoint of enlarging upon the kill.

There is one other consideration that we are not in a good position to evaluate. These waterfowl start mating along the latter part of December, and through January and February most of the birds have mated off. Whether or not killing an individual of the pair has any particular biological effects I am not prepared to say. I rather doubt that it is of great importance because the birds will again remate, but they are of additional vulnerability and I think all of you that have hunted waterfowl know particularly as far as family flocks of geese are concerned that you knock down one of the family and the chances are good that the remainder will circle until you knock them off. The same principle obtains for mated ducks.

Mr. PELLY. Is a duck monogamous?

Dr. LINDUSKA. As far as we know that is correct. They will mate with another later if one is killed.

Mr. MILLER. Is it not true that when the January date was established it was established on the best biological evidence you had at that time?

Dr. LINDUSKA. That is correct.

Mr. MILLER. Since that time you have found that you can shove it forward or backward another 10 days. As you accumulate more evidence it may be possible that you can still liberalize it, but on the basis of any present biological data that you now have it would be dangerous and you would almost be going beyond the point of no return to go much beyond January 10; is that correct?

Dr. LINDUSKA. That is correct. I would say that in addition to accumulating data we would have to accumulate more birds.

Mr. MILLER. That is right.

Dr. LINDUSKA. It is a liberalization along with length of season and bag limit. If we have a favorable year and we feel that we can liberalize we can liberalize in terms of a later hunting date, going from January 10 to 20 in lieu of an additional number of hunting days.

Invariably when these dates have been brought up to the States for consideration they say "We would like our season extended in terms of number of shooting days before we consider liberalization on either end of the shooting season."

Mr. MILLER. Of course, the variables in different parts of the country are so great, too, that it make it very difficult to fix these dates.

Dr. LINDUSKA. That is correct.

Mr. MILLER. I remember when in southern California they wanted a later date to get into the old southern district. After some wrangling we got that for a while. We find that in some of the upper mountain lakes it was not so good. We had hunters saying "We want to go back," because you had a different climatic condition in a lake that was 3,000 feet high than you did at sea level. That is peculiar to that area.

Dr. LINDUSKA. That is basically why the split season was developed, sir.

The CHAIRMAN. Are there any other questions?

Mr. Allen?

Mr. ALLEN. I do not think you have said anything about what happened to the birds that pass south of our border until they come back. Have you any problem in a variation between the regulation which you enforce and those which are enforced in the countries to the south of us?

Dr. LINDUSKA. No, we are covered of course by treaty with Canada and Mexico. We do know that some of these same birds also go on down into Central and South America. But I think without any question the hunting public in the United States is taking by far the lion's share of the overall crop of birds, even though our regulations are somewhat more conservative than in Canada and Mexico.

Mexico has been the subject of a lot of discussion from time to time and in order to put ourselves in a position to speak authoritatively on what happens in Mexico as far as waterfowl are concerned we had a man detailed to just that job for a period of several years.

The sum and substance of his investigations were to the effect that the Mexican take of waterfowl is of little concern in terms of the continental management of the resource.

You have the situation down there wherein the great masses don't own a shotgun or cannot afford to buy shells for it. It was his conclusion that by and large the greatest kill in Mexico was by our own people going down there.

There are some abuses as you might expect with a country having far less means for managing resources than we do. I think the effect on the continental population in Mexico and any movements into the West Indies, Cuba, and South America are nominal.

Mr. ALLEN. That is true that even though there are isloated cases that we hear of people taking three or four hundred ducks at one shoot the number of those people is so small?

Dr. LINDUSKA. Yes, they are the exception, but are usually quoted as being the rule.

Mr. ALLEN. Thank you.

Mr. MILLER. Are there areas down there where the natives take per capita a great number of birds, but traditionally they have done it and it is a source of food for them? They have methods of taking them without shooting them, but weighed against the population of Mexico and the number of birds taken in this country, that is an insignificant number?

Dr. LINDUSKA. That is correct.

The CHAIRMAN. Does Cuba cooperate in your programs?

Dr. LINDUSKA. Cuba is not covered by our Migratory Bird Treaty Convention and our contacts with Cuba are rather nominal.

The CHAIRMAN. They kill a great number of doves in Cuba and the dove is protected by you?

Dr. LINDUSKA. We don't know just how many of our eastern mourning doves go into Cuba. Cuba has its own doves which appear frequently along the coast of Florida.

The CHAIRMAN. Do they have a limit on the number of doves?

Dr. LINDUSKA. Yes, they have seasons and bag limits.

The CHAIRMAN. Are there any questions?

Mr. BOYKIN. I would like to ask a question. Our season usually comes in about November 20, but we hardly ever hunt until December because it is too warm. I have often thought it would be wonderful if you could pick up your gun and shoot all the different animals at the same time.

We have the squirrel season about 20 days ahead. You give a fee for a permit to go out there and kill a few squirrels and these young pheasants are coming along and it is hard not to shoot them. I think it might be a good idea to start the season on everything in a particular State at the same time and stop at the same time. As it is you really force a man to break the law. It is awfully hard when you are out shooting squirrels not to shoot a big buck who springs up. Have you thought of that?

Dr. LINDUSKA. You have a good point there. There is an advantage that appeals to many people by having their hunting spread out.

Mr. BOYKIN. They kill a lot of game that is not in season and you make outlaws out of them.

Mr. MILLER. Sometimes those gobblers look like ducks, too.

Dr. LINDUSKA. I think, Mr. Boykin, that the main consideration of the States, as well as ours, is in gearing those seasons to the biological requirements of the animal and the ultimate possibilities of harvest, and your squirrels may be of such a measure of prosperity to justify a 40- to 50-day season whereas your quail may require some protection and a shorter season. That is the main consideration in establishing seasons.

The CHAIRMAN. Do you have any programs in cooperation with land owners where you would take the land over as a refuge and would not have to buy the land?

Dr. LINDUSKA Mr. Salyer, who is next on the docket, will be in a position to answer that, sir.

The CHAIRMAN. Thank you very much.

Dr. LINDUSKA. Thank you, sir.

Mr. Swift, I believe, had some remarks here.

STATEMENT OF ERNEST F. SWIFT, ASSISTANT DIRECTOR, FISH AND WILDLIFE SERVICE—Resumed

Mr. SWIFT. Mr. Chairman, I wanted to discuss for a few minutes the very important place that the States take in the cooperation of the mechanics of the developing of regulations. I was going to do that in the absence of Mr. Farley. Mr. Farley is here and I think that he would probably want to make that statement.

Mr. FARLEY. Will you please go ahead?

Mr. SWIFT. Over the years, as the State conservation departments have developed in land power, money, and strength, they have taken increasing interest in the management of the migratory waterfowl. A great deal of that is due to the fact that the migratory waterfowl has been decreasing and the regulations have, of necessity, become more stringent and the States also have an association. They call it the International Association of Fish, Game, and Conservation Commissioners. The members are the commissioners of the States and the conservation directors.

This organization, back in 1951, developed a philosophy of having a flyway council in each of the four flyways. The membership of each flyway council is the directors of each State. That makes four councils with their representatives. Each flyway, in turn, elects 2 members to a national waterfowl council which is composed of a membership of 8 that meets and works with the Fish and Wildlife Service on the recommendation and development of regulations.

The two members that belong to the waterfowl council from the Atlantic, for example, take the information from the flyway council of the Atlantic. The two members working with the flyway council of the Mississippi take that information in the central flyway and Pacific. They have the same information that the Fish and Wildlife Service has. In fact, they send men up into Canada to work on the summer surveys and in that way, by dissemination and evaluation of all the available information that can be obtained from the North American Continent on migratory waterfowl is brought to a head in Washington here in August of each year with this group.

In addition to that, the Audubon Society, the Izaak Walton League, the Wildlife Management Institute, the National Federation, each send a representative there to also sit in, in an advisory capacity.

The matter of surveys is carried on the year round and these various flyway organizations are constantly being given that information so that when they come here they have had a year practically of background of survey and they don't just sit down around a table in the middle of August and dream up what these regulations are going to be.

A great many people do not understand the tremendous amount of work by the Service and the States that goes into developing this very complicated business of regulation. I just wanted to evaluate that before you gentlemen, because without the States we could not do it and they couldn't do it without us; and I think it is a very high type of cooperation on one of the most difficult subjects to satisfy everybody on, that there is. I just wanted to call your attention to the State participation which is very valuable and very extensive.

The CHAIRMAN. Thank you, sir.

Dr. Linduska, when you were talking about the population of the birds, taking an estimate, you did not in the record state whether the population of various types of migratory birds was on the increase, or the decrease, or holding their own.

Dr. LINDUSKA. It is a hard subject to generalize on even if you consider only ducks. We have some species that we know have been more prosperous in the last few years, and others have gone down.

The CHAIRMAN. Which ones?

Dr. LINDUSKA. Pintails. In the western portion of Saskatchewan and on into Alberta they have been inordinately prosperous for the last 4 or 5 years. On the other hand, wood ducks reached a stage in their numbers that prompted us to close the season in the Mississippi flyway last year.

I would say, as a broad generalization, the population within the last 4 or 5 years has not changed one way or the other.

The CHAIRMAN. What about brant?

Dr. LINDUSKA. Brant, as a long-term average, have come up.

The CHAIRMAN. Swan?

Dr. LINDUSKA. The swan, substantially.

The CHAIRMAN. Are they increasing greatly?

Dr. LINDUSKA. I wouldn't say greatly, but they have done well and have increased over the last 6 or 7 years that we have been keeping track of them.

The CHAIRMAN. Do you have figures that you could put in the record?

Dr. LINDUSKA. Because of the tremendous distribution of waterfowl we never feel that we are justified in giving totals.

The CHAIRMAN. You take a survey.

Dr. LINDUSKA. But we interpret that in terms of an index to their numbers. We can tell you whether they are up or down in terms of percentages, but as far as a total is concerned we are handicapped by the fact that for one thing a good bit of the Yukon Territory has never been mapped and our coverage is incomplete.

The CHAIRMAN. I am talking about birds that come into the various flyways. Are they on the increase or decrease?

Dr. LINDUSKA. From the combination of breeding ground index, winter inventory, and incidental observations as they move through, we think that population has remained pretty much the same for the last 4 years.

The CHAIRMAN. How about the prior 5 years? Have they increased?

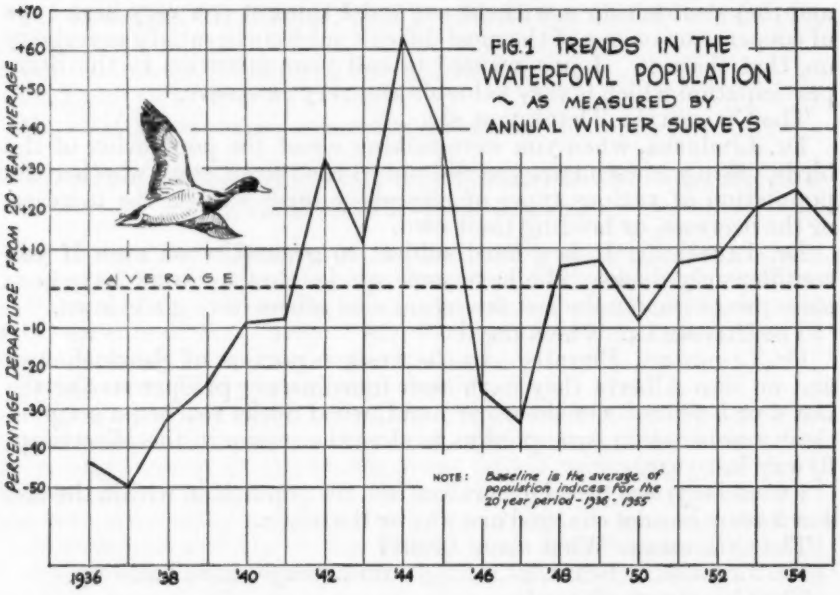
Dr. LINDUSKA. They have increased over a 5-year average I would say.

The CHAIRMAN. All right. Mr. Miller?

Mr. MILLER. You could put those indices in the record, could you not, or would you want to do that?

Dr. LINDUSKA. Yes; we have a graph that will show the trend.

(Information referred to follows:)



Mr. MILLER. I think that gives you the relative picture. You mentioned wood ducks. You have not hunted wood ducks in the West for a long time. The season closed in California.

Dr. LINDUSKA. No; we have had a wood duck season out there. It was closed for an extended period of time 10 or 15 years ago.

Mr. MILLER. It was closed for a long time.

Dr. LINDUSKA. Along with redheads, canvasbacks, and a few other species.

The CHAIRMAN. At this point in the record, furnish for the record the specie on which the hunting season is closed.

Are there a number of them?

Dr. LINDUSKA. No; there are not a number of them.

The CHAIRMAN. There is the wood duck and what else?

Dr. LINDUSKA. That is about the size of it. Many of your swans are protected, of course, and some of the plovers and other shore birds.

Mr. VAN PELT. Swans are all protected, are they not, Doctor?

Dr. LINDUSKA. Yes, sir. The snow geese in the Atlantic flyway are protected. The sand-hill cranes, little brown cranes, and whooping cranes are protected, but there we begin to distinguish sporting and nonsporting species. I would say the wood duck is the only duck.

The CHAIRMAN. Are they protected on the Atlantic flyway?

Dr. LINDUSKA. No.

The CHAIRMAN. They are open shooting?

Dr. LINDUSKA. Yes. The only place they appear to be in jeopardy is on the Mississippi flyway.

Mr. FARLEY. I wonder if it would be helpful to the committee if we furnish the population by trends in the last several years?

The CHAIRMAN. Yes, because I anticipate that a lot of people interested in the subject will want copies of these hearings.

Mr. FARLEY. We will be glad to furnish this.

(Information referred to is shown on chart.)

The CHAIRMAN. The next witness.

Mr. SWIFT. If there are no more questions on the matter of research and game management, Mr. Chairman, Mr. J. Clark Salyer, of the Branch of Wildlife Refuges, will continue.

The CHAIRMAN. Give your full name and your background. For the record that we had yesterday, I want each one of the gentlemen appearing here to give his background so that the persons reading this will know what has been done each year.

STATEMENT OF J. CLARK SALYER, II, CHIEF, BRANCH OF WILDLIFE REFUGES, FISH AND WILDLIFE SERVICE

Mr. SALYER. My name is J. Clark Salyer, II. I got my training in wildlife administration at the University of Michigan. Prior to that I was on the technical wildlife staff of the Institute of Fisheries Research, and prior to that I was State Wildlife Biologist of Iowa. I came to Washington on June 30, 1934, with the famous conservationist, "Ding" Darling, to help start the national wildlife refuge program, and I have been at it ever since.

The major phases of our refuge program around which I am basing this talk are the objectives of the program; a brief statement of the legal background; the accomplishments of the program; the pattern of development; the economic-use program; the recreational-use program; the current problems and the future of the program.

The refuge concept is a very ancient one in the field of game management and as originally applied was devoted wholly to complete protection for a group of animals or population of game from hunting.

Now, while the original definition still pertains somewhat it has been broadened through the years by the evolution and our experience to where we not only try to protect these animals but we try to increase them to where there is a surplus; and that is the modern concept of game management in which the refuge idea is a very important tool.

The original fundamental objective of the refuge program and the continuing objective is the preservation of a basic brood stock for the perpetuation of the species. With our Service particularly it is the preservation of our waterfowl resource and its habitat.

A somewhat related objective is the preservation of wildlife habitat in the great ecological areas of the country, such definite types of habitat as the rangelands of the West, the western mountains, the Lake States forests, the southern hardwood swamps, the peculiar Piedmont habitat, the Atlantic coastal salt marsh.

All of those areas have characteristic types of flora and animals that we need to preserve and which the public has asked us to preserve

for future use and enjoyment, and they are particularly useful for study of game management methods over vast areas of public property.

One of the most important of our present-day conservation problems is the management of our range lands. The degree to which we do that successfully will preserve our big game herds. One of the earliest activities of Congress in game management came after great public interest in the welfare of some of these herds and after repeated crises Congress stepped in and established such areas as our National Elk Refuge in Wyoming, the Charles Sheldon Antelope Refuge, the National Bison Range, and others.

The Service has a legal and moral obligation to two great groups of the public. The first is the general group of conservationists and wildlife lovers that want all wildlife protected from hunting. The other group is the group that buy the duck stamp and are willing to tax themselves somewhat not only to maintain the resource but to extend it to where there is a huntable surplus.

So the objectives of the program might be said to be primarily the saving of a basic brood stock, the saving of as much waterfowl habitat as we have because it is already evidenced that this waterfowl resource in the future is going to have to be maintained almost wholly on State and Federal lands plus the small percentage of privately owned hunting grounds. This is because of the rapid deterioration of the natural habitat of the water-fowl resource which is happening because of inroads of agriculture, navigation, of the oil and gas production, salt water intrusion, and many other factors which are destroying our waterfowl habitat much faster than we can restore it.

To summarize, then, our objective is primarily the preservation of the basic brood stock, the habitat, saving rare species, saving remnant herds like the bison and the longhorn steers, and then the distribution of waterfowl among States to assure fairly equal hunting opportunities. For example, the State of New York made a study of our Montezuma Refuge, one of the earliest ones that we protected. They found that that refuge greatly affected hunting success for 100 miles around it.

The CHAIRMAN. When you name the refuge give the location.

Mr. SALYER. Montezuma Refuge in New York.

The State authorities sat down and made a grid of State areas in that State to improve hunting and give more hunting opportunities. Likewise, we do not want all of our eggs in one basket. We do not want all the waterfowl in a few areas because of the disease situation.

As Dr. Linduska told you, we live in mortal dread of the outbreaks of botulism which could occur if you put too many waterfowl or any other animals in close quarters. The recent outbreaks of fowl cholera, derived apparently from the common domestic poultry cholera, we live in mortal dread of also because it is so destructive and lasts so long. You know that a lot of farmers do not bury their dead birds. They go to town and throw them out of the car at the first culvert they pass. It has been very bad in Texas and California and in other waterfowl areas.

Of course public shooting is an end-product of our refuge program. The refuge program is not devised to primarily produce more hunting since there will always be a greater part of the acreage of waterfowl refuges closed; but it has been possible to increase locally the flocks

using a particular area to a point where good management itself dictates that we open some of these areas to public hunting.

The first refuge I guess established in the United States was by Teddy Roosevelt in 1903 on a little 3-acre island off the mouth of the Indian River in Florida. At that time it had quite a bird population, herons and egrets, and so forth, that were being destroyed by the plume hunters. The President established that little refuge under the inherent powers of his office and from then on up to about 1930 about 30 small refuges on outlying islands and sandspits and mud lumps around our country were established to protect colonial birds mostly.

While the migratory-bird treaty was passed in 1916 and is the basic planning on which our work is based, nothing happened until about 1924. In 1924 Congress set up the Great Upper Mississippi Fish and Game Refuge, which runs for 360 miles along that river.

The CHAIRMAN. Where is that located?

Mr. SALYER. That runs from Wabasha, Minn., down the river now to St. Louis. In those days it came down the river to about half way down the Illinois line. It straddles the river in Missouri, Illinois, Wisconsin, Iowa, and Minnesota. It is along the course of the river there for 360 miles.

In 1928 the Great Bear River Refuge was authorized. You may remember that the Bear River comes down and makes an extensive delta into the Great Salt Lake. It is very silt laden. When it comes down and hits the saltwater of Salt Lake it precipitates the silt and produces that condition that Dr. Linduska described, an amoebic habitat wherein this botulism breaks out which formerly annihilated several million birds. It was there that most of the first research was done, so that Congress set up this refuge to correct that death trap and by and large it has.

Where we used to lose three-quarters of a million to a million birds, now it is generally a couple of thousand. We have tremendous concentrations there. A million birds in the migratory period is not an unusual number at that refuge.

However, nothing much happened until the important date of 1929. At that time Congress was distinguished by a stalwart group of conservationists and men who had a practical knowledge of wildlife. Those men more so than the professional conservationists saw the problems of the century and the great reduction in wildlife and wildlife habitat. At that time you remember we were well into the 5-year drought of which 1929 was about the center period. At that time the drainage craze was at its height and was affecting a great deal of the waterfowl resource.

These other harmful activities in the way of oil production and salt-water intrusions were very evident so that this group of men saw the necessity and passed the Migratory Bird Conservation Act. At that time we had such men helping in the wildlife field as Charles McNary, on the Senate side, Keith Pittman, the lovable Peter Norbeck, and Senator Hayden, from Arizona. In that 1930 group on the Representative side we had Kleberg, of Texas, and Andresen of Minnesota, who is still on the job, and Robertson, from Virginia, who is now a Senator and is a member of our Migratory Bird Conservation Committee, and Congressman Bonner, and in the last 15 years, Clark

Thompson and Boykin and Delegate Bartlett and Metcalf and Tollefson.

I mention these men because it shows the interest and initiative of Congress in solving our early wildlife problems. I hope we have their modern prototypes today because the refuge problem right now is in a mess. It is in the process of being embalmed and it needs a blood transfusion from you men.

So the 1929 act implemented the opportunities set forth in the Migratory Bird Treaty. It provided that we definitely set up a system of national wildlife refuges, that we seek them out and build them and staff them and try to restore the existing habitats of the country. It also set up a legal mechanism or commission to legalize and to regulate our purchases of land for this purpose. That was the Migratory Conservation Commission composed of the Secretaries of Agriculture, Commerce, and Interior, plus 2 representatives and 2 Senators. The present composition of that body in addition to the secretaries is Congressman Andresen, one of the original authors of the bill, from Minnesota, Congressman Karsten from Missouri, Senator Robertson from Virginia, and Senator John Bricker from Ohio.

That laid the groundwork there for the beginning of what is now the National Wildlife Program. Over the next 3 or 4 years, Congress made available to implement the program about $1½ million and the Service bought a number of wildlife areas; for example, Swanquarter in North Carolina. It started the Savannah Refuge in Georgia and bought 2 or 3 others.

At that time the crisis of the depression around 1934 had hit us. You may recall that "Ding" Darling came to town at that time to start this program. He went around town with his tin cup. There was a lot of floating money in those days and he managed to get around $8½ million to initiate this program.

We immediately took it out and buried it in some good fundamental wildlife areas. This early money financed the program through 1936 and then Congress came to the rescue with another $7 million so that with that $14½ million more or less in the period between 1934 and 1939 we purchased and developed around 62 new waterfowl areas.

Another helpful feature at that time was an original passage of the Federal Migratory Bird Hunting Stamp Act, since amended in 1949, which provided that all hunters of waterfowl buy the $1 duck stamp and that the proceeds of that go for the enforcement of waterfowl regulations and the continuance of the refuge program. This act was subsequently amended in 1949 as I shall show later.

At that time we had lots of money for land acquisition. In addition to that we had a number of areas, well over three-quarters of a million acres that we got by using other lands. The Army engineer reservoirs, the TVA pools, the many fine reservoirs of the Reclamation Service, some areas purchased by the old resettlement administration; so that we had almost 3 million acres of land during that period by purchase, by gift, by use, by superimposition on areas.

We had all the CCC camps, all the WPA labor forces, but we did not get started. We had no money for material. Difference from most wildlife management you have to have material things in waterfowl management. You have to have concrete, steel. You have to have fencing. You have to have telephone lines and draglines and construction tractors, etc.

While we had all the land and all the labor, we lacked that little catalyst of material. At that time our duck stamp in 1935 had brought in $635,000. The next year it brought in $448,000. It crept to $783,000 in 1938. It finally reached the million mark in 1939.

Even in those days a modern refuge for waterfowl, land purchase and construction, cost between $750,000 and $1 million. So if we had piled up all of that duck stamp income and used it wholly for land purchase in those days, we could have only established about 2½ refuges in the period between 1935 and 1939.

We thought the problem over. Here was too great an opportunity to miss. The thing to do was to use the early duck stamp money for buying the materials to go with all this free labor and available land.

As I said, we created 62 new refuge areas and improved old ones to where we had almost 3 million acres of waterfowl land in 5 years. In other words, we advanced our program 18 years over what we would have done if we had been confined just to the rather low income from the duck stamp.

I wish you would keep that in mind, because I am going to discuss that later, and there have been some loose charges thrown around about the way the Service used the duck stamp in recent months.

Now, what did we accomplish in all this mixture of lands and money and materials? As of this date we have 272 national wildlife refuges. It extends from Alaska across the broad continental base of our country to Puerto Rico and west to Hawaii. Nine million of these acres are within the continental United States, 7 million in the Alaskan territories. Of these 272 refuge areas, 205 of them, totaling almost 3½ million acres, is restored waterfowl habitat.

There are 137 waterfowl refuges which the Government owns in fee simple. There are 68 wildlife refuges under perpetual easement. This latter program is very interesting, because during the depression days the Great Plains States were very much hurt economically and thousands of farmers were in distress. That was not a great industrial area. It so happened that the Fish and Wildlife Service was the only governmental agency that could employ men and their teams, farmers, in other words.

The farmers did not want to give up their land. We could only work on land on which we had some legal control. So we entered into a series of perpetual easements whereby portions of their land could be used for management. Those people wanted to see water put on the land so that we were able to create many new waterfowl areas, all with newly impounded water to help the waterfowl situation. These are all still in existence and some have proved to be such good waterfowl producers that we are planning to buy some half dozen of them as permanent parts of the waterfowl program.

Mr. MILLER. Where are those located?

Mr. SALYER. Here are some of the outstanding ones that we were able to put together in those days: Blackwater refuge, over in Maryland, one of our most successful goose areas. Back Bay, which came toward the latter part of the program in the late 1930's and early 1940's. Back Bay is over on the east shore of Virginia.

Then, of course, our great superrefuge, Lake Mattamuskeet, in North Carolina; Swan Lake, in Missouri; Delta refuge, at the extreme mouth of the Mississippi, in Louisiana; the Aransas Refuge in Texas,

almost the complete home at present of the whooping crane. Montezuma Refuge in New York; Turnbull Refuge in Washington; Sacramento in California; Horicon in Wisconsin; Shiowassee in Michigan; the Valentine and Crescent Lake refuges in Nebraka; and the others to the total of some 205 refuges.

Some of the highlights of this program are very interesting to show the variety and success of the program. You remember that in those days there were about 73 trumpeter swans just west of Yelowstone Park on the Red Rock Lakes. This was purchased in this program and management practices started so that today we have 642 trumpeter swans, and have been able to establish 3 new colonies away from there. The refuge probably is saturated and we know that swans are going into the flyway because in recent years colonies have appeared in Canada that have not been found before.

One of the most important and dramatic things in the program is the way the Canada goose responded to it in the Mississippi flyway. In the 20 years we have been doing this work we have absolutely doubled the Canada goose population. Around 1934 it was hovering around 100,000 geese. Today it is well over 250,000. The way Canada geese responds to management almost beclouds the imagination.

I want to read some figures which show how they respond. Take for example our Crab Orchard refuge in southern Illinois which is put on one of the wartime ammunition plants and was partly an old resettlement area. When we established Crab Orchard in 1945 there had not been a goose in there for a century. We started a little feeding and a decoy flock and built it up the next year to 486 geese. They have increased yearly until in 1954 the peak population there was 48,000 geese. Those weren't geese taken from somewhere else. This was the growth of that particular flock of geese through protection.

The CHAIRMAN. Is that the refuge that I think of in connection with Mr. Bishop?

Mr. SALYER. Yes. That is kind of an interesting situation because it is one of our special refuges. Mr. Bishop's problem was that there were six Federal agencies with a finger in the pie but no separate responsibility.

We had been after the area for a great many years because it was a key wintering ground for geese. After the war it was decided that the service could best manage the area and they gave us a waterfowl work and all the rest. There was an industry there. There was soil conservation.

The CHAIRMAN. This is the chart back there?

Mr. SALYER. I am glad you mentioned that. This shows some of the variety of activities going on there. This portion of the area is the refuge and all this other area is the recreational and hunting area.

We have 48,000 geese there. Over a million people hunt, fish, and picnic there. This is the most important area for dog trials in the United States now with about five national trials. Those are national retriever trials, the national beagle, and so on. Scattered through this 20,000 acres are about $15 million worth of buildings. One of the behests of Congress was to make use of those buildings.

You remember this is a wornout coal-mining area. After the recent war we had 8,000 veterans stranded there with no work. We were given the job of not only restoring the wildlife but trying to get

some industry in there. We have managed to get between 18 and 20 industries employing between 2,000 and 3,000 people on the refuge.

The CHAIRMAN. That was surplus military property, was it?

Mr. SALYER. Originally 22,000 acres was bought by resettlement as wornout farmland. The Army bought the other 22,000 and made it a major bomb-loading plant.

The CHAIRMAN. We passed a special act, did we, giving this to you people?

Mr. SALYER. That is right.

The CHAIRMAN. What other surplus military properties have you been able to acquire?

Mr. SALYER. We have not been so successful in that situation. We have asked for some but generally they are taken for industrial use. In fact I cannot right now think of a single area comparable to that. We have, of course, been able to use some of the Army dams quite successfully in this program. I will touch on that a little later.

Mr. TOLLEFSON. Mr. Salyer, you said you had 8 million veterans over there?

Mr. SALYER. Eight thousand. The coal mines are in the process of being worn out. There is not much opportunity for young people unless it is new industry.

The CHAIRMAN. It was a strip-mine area?

Mr. SALYER. Yes; in part.

The way these geese respond is most dramatic. Take the Horicon refuge area which the State of Wisconsin and the Service have restored in the last 10 years. No geese were there to speak of, less than 100 before the project was instigated. It went from zero up to a peak of 47,000 geese in 1954. It so happens a public road goes across this project. The people more so than the hunters were charmed by this concentration. They drove out in almost uncontrollable crowds and parked to watch these geese, and it is a common sight to see 500 people on the road gawking at these geese sitting 30 feet over the line. They know they are safe. Last fall they had to call out the State police and after a traffic count the State roads department is widening the road and putting a parking area on each side of it.

It is not always only the hunters and fishermen that have interest in wildlife.

Mr. VAN PELT. I would like to add that they abandoned the road through the marsh and now have that new highway at the north end.

Mr. SALYER. That is the one I refer to, sir. The abandoned road is still serviceable. We take conducted tours through there about twice a week in summertime and people can see the birds and broods and get a chance for color photography.

Mr. VAN PELT. That is about 12 miles from my home.

Mr. SALYER. That is a breeding ground. Almost every variety of duck common to the Mississippi Valley is breeding there now and especially diving ducks which are hard put for nesting ground, and even Canada geese. We have about 6 or 8 broods of Canada geese.

The CHAIRMAN. The feed area is 21,000 acres and the State has about 18,000 acres, as I remember it. You may remember that the fight on Horicon was one of the great conservation struggles of this quarter century, the need for putting a dam back and the legal and prejudicial attitude of certain parts of the public against putting it back. It took about 25 years of court and public relations to get that

dam back and restore this great area. It had been drained and tried as a dairy area, and had failed in that respect.

Mr. SALYER. Another striking concentration of restoration is Swan Lake in Missouri where no geese had been found for years and where, after the establishment of this area, they rapidly increased and built up to a population of 105,000 this past fall.

The coming fall the State of Missouri has agreed with us that they are numerous enough now to have some harvest and there is going to be a public shooting ground open on these areas.

It isn't possible to carry the modern population on these game or waterfowl refuges by simply trying to get by on aquatic food. There is not enough aquatic foods to carry the population that we have to pyramid there. The habitat for these birds has so decreased that we have to carry more birds per acre than occurred under natural conditions. They speedily eat out the natural aquatics, and natural aquatics are here 1 day and gone tomorrow. The reason we have been able to make these refuges carry these birds is the employment of farmland and agricultural crops. That has been our salvation and continues to be so, so that now we rarely buy a new area without buying some cropland. You can show most strikingly what happens when you add cropland.

I will have to hold these up because they are so small. This chart shows the growth of the goose population at the Swan Lake National Wildlife Refuge. The green line represents the farmland under cultivation. The red line represents the increase in the goose population.

You will notice that when we first bought Swan Lake the land was submarginal and we went along during the construction period in which we built the dams and did not see any great increase, just a few birds.

In 1942 we had the pools in and started to grow the crops. Notice how the peak of the birds commenced to jump up. Then at this period we started to apply soil and moisture methods, modern methods, and the combination of increased production and the hot food as we call it, the grain food, caused it to almost jump off the chart.

Mr. TOLLEFSON. How do you use that farmland?

Mr. SALYER. In buying our land we have this policy: That if a farmer sells all or part of the land for the project he gets first call on it when farming comes up again. We sometimes split their holdings so that we took part and left part. We knew we had to crop these lands and said "You will get first call on it." We do it on a share-crop basis. We are raising 84,000 acres of grain for birds today. That would take more than our whole maintenance program. So we share-crop this land and the farmer leaves our share in the field for the birds when he harvests it. It makes a very fine thing for the local economy.

Practically every acre that is farmable in our program or can be grazed or hayed is still being productive. The local economy has been very little disrupted. If a farmer who sold his land to the project decides that he does not want to farm any longer we give it to somebody in the immediate vicinity. We always have a policy of working in young veterans that were fighting our battles when much of this land was being converted and who have come back and want an opportunity to get into the agricultural game and cannot get it.

We infuse as many of these as we can into our program. We don't want people on a speculative basis, 30 miles or even 15 miles away. We want to live as good neighbors with the local people.

Back in the Appropriation Act of June 15, 1935, Congress directed that we could dispose of surplus products on the refuges; the timber, the furs, the crops, the coal mines. In one case an opal mine; all the other things we find on this 17 million acres of land if it is surplus to wild life.

The CHAIRMAN. Seventeen million is the acreage?

Mr. SALYER. Acres of wildlife refuges.

The CHAIRMAN. But what is it on this particular one?

Mr. SALYER. On Swan Lake it is 10,675 acres. It provided that we should turn this money over to the Treasury but 25 percent of it should go to the local townships principally for roads and schools, because it is the tax base for roads and schools that is mostly disrupted by Federal acquisition.

Then you remember when our refuge dollar was only worth 50 cents. In 1949 after the war Congress amended the act to permit the income from disposal of surplus products to be used for maintaining the areas which was quite a boost.

This shows in another way just how the goose population comes up with the addition of cropland.

The CHAIRMAN. How much shooting is there in that area?

Mr. SALYER. As I said, Swan Lake is due to be opened on a State-managed shooting area next year and it is a vicious cycle. There has been excellent shooting all around this area for maybe 30 miles. We purchased this land for around $11 or $12 an acre for the best of it and it probably averages to about $9. Today entirely around that refuge boundary you cannot buy an acre of land for less than $600 and it is all based for its value for the shooting, so that once you start these areas you had better get the acquistion over because you are going to price yourself out of the market by your own activity.

The CHAIRMAN. How much shooting is there on your 11,000 acre area?

Mr. SALYER. This area for various reasons has not been opened yet, but the State is going to manage a shooting area which we propose to open this coming fall.

The CHAIRMAN. It will be a joint operation?

Mr. SALYER. Yes. I might say we have shooting on quite a few refuge areas and in every case the shooting activity is managed by the State department.

The CHAIRMAN. You get a proportion of the hunting fee?

Mr. SALYER. No, we figure that when the sportsman bought his $2 duck stamp he paid the Federal fee. The State is managing the area and it has to be well managed and there is quite a bit of expense. So most States charge a nominal fee with our concurrence.

One of the most successful areas we have has been managed for a couple of years on Horicon where we have the tremendous goose production. They have found that their expenses are about $1 a man. That is this year they had sixteen-thousand-some gunners go through the State blinds on that hunting area. Some States have enough money in the treasury that they do not have to make a charge, but on

the whole charges do run the operation; and if they make a profit they put it back into improving the project.

The CHAIRMAN. Are there some areas in which you get a little out of the hunting?

Mr. SALYER. No.

The CHAIRMAN. That always goes to the State?

Mr. SALYER. It all goes to the State. We do not want to get to the position of prostituting these areas for a little hunting fee. It is bad psychology.

How have the waterfowl responded to these areas? We have just counted the peak populations last fall using these areas, the peak for a whole zone in a given area. We find, for example, that the Atlantic flyway had a peak population on refuges of 1,722,000 birds. The Mississippi flyway, the greatest flyway of all, had 6,786,000 birds. The Central flyway had 2,964,000 birds, and the Pacific flyway which is the flyway that is the best off with respect to waterfowl now, had on the refuges a peak population of 10,664,000 birds.

Waterfowl is not the only product of these refuges. There is a very interesting byproduct in big game and upland game.

One of the most fascinating things to me was the Bombay Hook refuge in Delaware. Probably in the State of Delaware where we started in there were 1 or 2 or 3 deer wandering around and they found this area. The deer increased so to where they got to be an agricultural nuisance. So last fall, based on the refuge deer herd, Delaware had the first deer hunt in a half century.

Mr. MILLER. Do you have a crop depredation around some of these areas?

Mr. SALYER. If you do not control the population. Along the refuge areas we control the depredations with our crops. That is another reason why we have to have crops, incidentally. On all game areas where there are big game you have to keep the herd cut down to where the amount of forage will suffice.

Mr. MILLER. How about waterfowl? Do you have any depredation around the area of waterfowl?

Mr. SALYER. We have in the past, but have learned to control it. We used to have a terrible time in the Dakotas. Maybe you know something of their method of agriculture up there. With the coming of the combine they no longer shock and then thresh wheat. They wait until it is dry and cut it like a row of hay. Normally they can do that and have it all done and out of the way by September 10, when the Canadian migration comes down, but about every third or fourth year they get a wet fall. They get these rains and they hang on. There are dark cloudy days when they cannot thresh. Sometimes the grain even sprouts and a lot of it is wasted.

They think the waterfowl do it, but it is actually molded in the rows. That is just like a banquet table to waterfowl. Then we have to get out. We have on the refuge about 5,000 acres of crops. We have to spread grain around on the refuge to feed these birds and also go out and help the farmers scare them from the field. We use airplane control quite a bit. We have evolved through the years the system called the block system. All of your men, including refuge people and game management agents, that are available are given a certain block of the farms.

They have to patrol it morning and night to make sure that the birds are not bothering the farmer. This employee has so many acres of farms to patrol. He covers it twice daily. If he sees a big concentration of birds, he gets in touch with the plane, and if he cannot frighten them off they herd them to the refuge.

We have pretty well eliminated crop depredations from that spot. We have considerable depredation in California, as Dr. Linduska mentioned, and also in Puget Sound, where our snow geese like to feed on the radish and beet seed crops.

From the refuge standpoint where we can have a place to feed and keep these birds, we think we have pretty well solved the problem.

Mr. MILLER. Have you educated them in the Imperial Valley to stay in the refuge and keep out of the lettuce fields?

Mr. SALYER. That is one thing that is aggravating because of the species, particularly the widgeon, which prefers to feed upon green material, and it is hard to produce enough material to keep those birds out of private lands because there is very little land that we can acquire for refuge cropping purposes in that area. We started out there 15 years ago, and we thought we had a good thing, but the sea is coming up with the increase of agriculture irrigation.

The Imperial Valley is one of the greatest garden spots of the country. With the canal bringing in water every acre is under cultivation, so that the Salton Sea, which was originally below sea level, is coming up rapidly, and has covered two-thirds of our original area.

We are looking around for a site to continue the necessary cropping to feed these birds. We were on top of it about 5 years ago before the sea started on a rampage, with the State of California and ourself. The State of California has been completely wiped out and has retired from the general area and is trying to buy another area for replacement.

Mr. MILLER. They had to open their refuge up for hunting?

Mr. SALYER. We have a part of ours open for that purpose.

Mr. MILLER. You know there was a time about 10 or 12 years ago when your boys did not go to the Imperial Valley. They treated them just like they treat revenue men in your State and the way they do in Kentucky.

Mr. SALYER. So that there is a great byproduct for stocking purposes in the upland game field. Thousands of deer, raccoons, big horn sheep, antelope, turkeys, and pheasants have been trapped on Federal refuges and used to plant other State areas.

What is the pattern of development of a wildlife refuge? How do you build one? How do you start out? First you are faced with the investigation type phase in which a waterfowl biologist seeks out the possibilities for restoration. In the early days we made much of drain areas or defunct irrigation districts.

I figured once that we used 23 kinds of submarginal land in the program. We figured it was of no value to the resource to go out and buy an existing swamp that was producing birds; that if we were going to help the situation we should restore something, so that most of our work has been a restoring of habitat.

If favorable to the biologist we have a joint survey to determine whether or not the area can be developed economically and whether or not we might buy the land. If that is determined in a satisfactory

manner then we present the thing to the Migratory Bird Commission that I described earlier for approval. The land people move in and buy the land. Then we start the construction which has to do with the restoration of the water supply, with the marshes. We build the dams and dikes and the firelines and roads and put up the fences and put up the necessary buildings to get the project in shape for management.

Then the biological development takes over. There we plant up the water areas. That is a real job. Most of the plants that come in early in the restored waters are pioneer plants and are not good for waterfowl. The cattails, the maiden cane, certain types of lotus. We have to fight with those continually to establish the more desirable submerged aquatic plants.

Then immediately we have a soil survey and classify our lands as to its productivity. Then we have the problem of the upland game cover and the nesting cover. Then about that time the test plant problem hits us. That is getting to be a greater problem each year.

In the South there are half a dozen plants with which we wage war continually. They simply take over and crowd out the more desirable food plants. You are familiar with the waterhyacinth problem which is being controlled in the South in recent years—since the hurricane which started the Key West Highway. Many think it may have been blown in at that time. And we have this alligatorweed which anchors itself on any protruding mudbank in a marsh and crawls out on any surface and smothers out any types of plant. Any time there is a fragment of it knocked off a new plant is started.

We found on some of the land on which we had oil reservations that the wheels of the marsh buggies spread that stuff. It got so bad that we have gotten some of the big companies to agree to use helicopters in their seismographic work and stop spreading this pest over our refuges.

One of our refuges, the Lacassine Refuge, is on the verge of extinction because of this weed.

The CHAIRMAN. Where is that?

Mr. SALYER. Louisiana.

We have the economic use production and disposal of grain crops, forest products, the handling of the furs, grazing, recreation. I tried to dramatize what some of these physical developments amounted to to give you the impression of the size of this work.

There are on the refuge program today 1,136 miles of dams and dikes. That is the distance from Washington, D. C., to New Orleans, La. We have 1,681 quarters and service buildings in the program because a lot of our areas are isolated and there are no privately owned homes for the personnel. We have 4,500 miles of fencing. That would fence both sides of the road from Washington, D. C., to Salt Lake City, and have enough left over to fence from Washington, D. C., to Philadelphia.

We have 3,776 miles of roads and trails or the distance from Washington, D. C., to Los Angeles, and thence to Seattle, Wash. We have 574 miles of power and telephone lines or the distance from Washington, D. C., to Lansing, Mich. There are 208 water-control structures and 599 bridges.

The average staff of the average refuge consists of a refuge manager, a biologist, a mechanic, and a number, one or more, patrolman laborers, or employees, who do the actual maintenance of the project.

If a refuge is large enough there is sometimes an assistant manager.

As I explained we use farming and other resources of the refuge as

a management tool. If we do not graze or hay our lands the vegetation gets so thick that the ducks will not nest in it. Ducks do not like a thick area to nest in. They like an area that they can see out of so that we use this farming program, haying program, grazing program to keep the area in a state of dynamic production.

If we do not hay the areas the brush moves in and water fowl do not nest in the forest area very much. We manage the furs because they have an important part to play in making food and water available for waterfowl. Muskrats serve to keep the pool from getting too heavily vegetated. They keep a series of open pools for the waterfowl. There are a number of waterfowl pools that are so deeply planted that waterfowl other than the swans cannot get to them. A male mallard finds himself a muskrat to dig out the swamp potato for the mallard who cannot dig deep enough to get it.

You will see all over the reservation a muskrat surrounded by malards taking the surplus food. Muskrats are insurance for your marsh areas.

The CHAIRMAN. Is your philosophy in refuge a closed refuge or a combination refuge?

Mr. SALYER. You mean from the standpoint of what?

The CHAIRMAN. Shooting and perpetuation. What is your philosophy?

Mr. SALYER. The service's philosophy I think is this: Originally you remember when the birds were so low back in the thirties the whole idea was preservation and we set up a number of inviolate areas which are still and will always be inviolate because there is so little duck habitat in that area that we will not open them. We are embarking in the last decade on what we call a wildlife management area. It is not a closed area. It is developed with the same concept we had originally of saving the brood stock and saving the habitat but we manage it in such a way as to eventually produce a surplus and then it is good management to have a reasonable amount of shooting; but there will always be a big segment of the refuge program that must be kept closed.

The CHAIRMAN. I do not want to be personal about any particular area but, for instance, in the Pea Island refuge which is an inviolate refuge, before you went there there was a lot of hunting. I hunted there. I never saw a sick bird in the years that I hunted there.

Since you closed it up that is where you are having all this trouble of sick birds. I do not hear of it at Mattamuskeet which is further west in my State. You have all the biologists and scientists there. The local people think that to move those birds around instead of letting them concentrate and sit and eat out the food and sit there and die would help.

In addition you are then working in conjunction with the National Seashore Park to take over certain blocks of their land for refuge purposes, are you not?

Mr. SALYER. No.

The CHAIRMAN. In setting up the park there was a provision made for part of it to be a game refuge and I thought you might be working in conjunction with that. Let us stay with this Pea Island refuge which is a considerable piece of land and where your big flock of snow geese is located.

Do you not think that just a little open hunting in that area would help the situation instead of a concentration going there and siting down and eating up all the food and sitting there until they perish?

Mr. SALYER. The Pea Island was established to protect primarily that southern-most wintering ground of the snow geese. They are among our shyest geese. They do not move over a mile or so. They get out of the whole country. It so happens, contrary to popular belief, that that Canada goose group at Pea Island is not a stagnant group of birds. They move tremendously from one day to the next and interchange in the whole way down there.

Albemarle Sound is an important Canada goose winter area. Those birds even go as far as Mattamuskeet and back. They are not stagnant.

The CHAIRMAN. You have tried everything else, but you have not opened it to any hunting. This trouble was not there before you took it over.

Mr. SALYER. It was probably there and there was nobody there to observe it.

The CHAIRMAN. There were healthy geese and ducks and that was a big area of Brant shooting. I never got any sick geese there. Since you closed it up any native or hunter that knows anything about its past history knows that the birds from that area now would not be right to eat. I fussed with you long enough about this thing. I do think with all your knowledge and everything else, and I would like to discuss this in a friendly way because I am interested in the subject, commonsense plays a great part in the medical attention of the human anatomy.

I think all of us at a certain age could doctor ourselves if we had any sense at all. We know what the ailment is and what will help it. If we do not practice that we do not get very far. I hope that it will be tried since there are going to be other closed areas in that area from Oregon Inlet to Hatteras Inlet.

I suppose you will be violently opposed to opening it, but I do think that if those birds were stirred up a little I do not understand how it would hurt your snow geese because the Canadian geese do not frequent the same areas frequented by the snow geese.

You would be surprised to know how much I am communicated with and told about the geese that the people see staggering along the road which we have gone over before. That is the reason I asked your philosophy. I am glad to hear that you are opening up some other areas. I think the refuge serves a combined purpose.

Mr. SALYER. This problem is not confined to Pea Island. It is continental-wide. We are having mysterious dying of geese in every spot. A new spot showing up was Lacassine and Sabine in Louisiana this winter.

The CHAIRMAN. I do not want to go into it and take up the other people's time.

Down below Pea Island you do not run into that sickness around Hatteras. Over at Lake Mattamuskeet you do not run into that goose disease, but you run into that anywhere around Pea Island; so practical commonsense tells you that something is wrong in the Pea Island proposition itself.

The old native says that the goose sits there and eats up everything and stays there and stays there until he gets so that he cannot fly

and he just withers away. That is what the natives who have hunted there all their lives have to say. I hope you will give some consideration to opening that up and see if it would not help the situation.

Mr. SALYER. Legally, I do not believe we can open it.

The CHAIRMAN. I will fix it so that you can legally open it, if that is what is stopping you.

Mr. SALYER. That is not the whole story, of course. It is the causative factor there.

The CHAIRMAN. Send me a little memorandum stating why you cannot open it legally.

(Information supplied is as follows:)

In establishing the Cape Hatteras national seashore recreational area, within the boundaries of which the Pea Island National Wildlife Refuge is located, provision was made for setting aside public hunting grounds. This was accomplished cooperatively by the National Park Service, the North Carolina Wildlife Resources Commission and the Fish and Wildlife Service. A substantial acreage of excellent hunting ground has been made available for public use. Every effort has been made to allow for the maximum amount of public hunting consistent with the legislation establishing the Cape Hatteras national seashore recreational area.

Mr. SALYER. This economic-use program, of course, is used to keep our habitat in good condition. Considerable returns come in the way of return to the service and the counties from this source. Just to highlight it for you, grazing prevents erosion and conditions our habitat.

In the last year of record, 1953, we had 607,732 acres grazed; 788 permittees paid $329,000 for 375,600 A. U. M.'s. An A. U. M. is an animal-use month or the grazing necessary to take care of a cow for 1 month.

To show you how important it is on some refuge areas, especially in the Middle West and Far West, take the Valentine Refuge in Nebraska, where 29 ranchers grazed 45,256 A. U. M.'s. The total amount was $68,305, of which $17,076 went to the county. Another example is the great Malheur Refuge in Oregon, where 85 ranchers took off 96,256 A. U. M.'s, which brought in a total amount of $96,530, of which $24,132.50 went to the county.

It is interesting to note that in the days before the Service developed the Malheur Refuge the annual average tax revenue was about $9,000, but by restoring the range and increasing the carrying capacity of the pastures the county's proceeds have jumped to $24,000. In 1953, 350 permittees harvested 17,000 tons of hay, which brought in $28,000. On 21 refuges 231 persons harvested 9 million board-feet of timber, bringing in $135,000. Five hundred and forty-two farmers share-cropped 65,000 acres of farmland. They produced 1,450,000 bushels of grain or other crops. The farmers' share was 580,000 bushels and the Service's share was left in the ground for bird feed.

The CHAIRMAN. I am going to have to close this session. I want to give you the permission to extend your remarks with any other facts that you want to put into the record from now on, and I will give the members of the committee an opportunity to ask you any questions.

Mr. Miller?

Mr. MILLER. I have no questions.

The CHAIRMAN. Mr. Tollefson?

Mr. TOLLEFSON. I have no questions. But I want to say that I am glad that we are having this type of hearing. I have learned more about this type of work than I have learned in any one year.

The CHAIRMAN. Mr. Salyer has made a splendid witness. I would like to hear him further. He and I disagree, but we will probably get together someday.

I am interested, Mr. Salyer, in your saying that the Park Service has not approached you about any of that area down there. They have taken over the whole areas from Oregon Inlet to Ocracoke Inlet, and in taking it over there were certain sections of it that had to be left open to hunting.

Mr. SALYER. They have done that. You remember that part of the area at the extreme south end was to be left open and part left open up around the lighthouse across from the Pea Island ferry. That was done.

The CHAIRMAN. It will give you some additional refuge land, will it?

Mr. SALYER. It is open to hunting so that the refuge in the center will not be open. It is a bad thing in waterfowl management to have the open area in the center of a refuge area. It is better to have the closed area in the center of an area and have either end of it open.

The CHAIRMAN. At Mattamuskeet you have a cross section. You have 4 closed blocks and 4 open blocks.

Mr. SALYER. It is contiguous on the south shore, 12,000 acres in 1 block contiguous.

The CHAIRMAN. In the lake you have a closed and an open section.

Mr. SALYER. Here in effect between the combined Park Service and the refuge area we have a central closed area which is the refuge and some shooting on either end of it which is the ideal method.

The CHAIRMAN. I wish you would try that Pea Island thing for a year or two and see if that will relieve that.

I thank you.

Mr. SALYER. We will look into it carefully.

(Mr. Salyer's extension of remarks follows:)

EXTENSION OF REMARKS BY J. CLARK SALYER II, CHIEF, BRANCH OF WILDLIFE REFUGES, FISH AND WILDLIFE SERVICE

Thus, you can see the part which the refuges play in local farming and ranching economy and the great importance of haying and grazing as tools in wildlife management. Similarly, the proper harvest of furs produced on a wildlife refuge, especially muskrats, is an important management tool. Over the years march vegetation tends to get too dense for waterfowl use, especially for feeding and nesting. A reasonable number of muskrats is good for any marsh, as they tend to keep the proper balance between open-water areas and emergent vegetation in the refuge pools. Another management problem is the disposal of surplus big-game animals from fenced-in refuges like the National Bison Range, the Wichita Mountains Wildlife Refuge, and the Fort Niobrara National Wildlife Refuge, principally set up for preserving American bison and the historic longhorn steer. The included range will only take care of a herd of a given size in relation to good range management. Thus, it is the Service's policy to dispose of surplus animals of various age groups each year. First call for these surplus animals goes to States for restocking purposes and then to municipal and other sources for exhibition. Animals not needed for restocking or educational purposes are disposed of as meat to private citizens in the order of their application. They pay a stated sum for various types and portions of animals and generally pay a luxury price for the novel nature of these provisions. In fiscal year 1954 the Service disposed of the following animals for all purposes: Buffalo, 367; elk, 70; longhorn cattle, 137; and deer, 212. The total economic-

use income to the refuge program for the fiscal year 1954 was $2,257,411.75, of which the counties' share was $564,352.94.

Another important feature of refuge operations is the growing use of refuge areas for public recreation, especially that type of recreation centering around the enjoyment of the wildlife populations found on refuges. In 1953 there were 4,750,000 visitors to the national wildlife refuges—an increase of 1,243,092 visitors since 1951. Of these, 10 percent were hunters, 10 percent were fishermen, but 80 percent were conservationists, wildlife lovers, family picnics, students, photographers, and people who simply enjoy seeing animals in their natural and unspoiled environment. Often, as in the Plains States, the refuge areas present the only bodies of water for hundreds of miles around; it is imperative that the public be allowed to use such areas when this use does not impair the fundamental features of the particular refuge. The refuges present hundreds of acres of new fishing opportunity to the American sportsman. In 1954 there were 32 refuges open to waterfowl hunting, making available to the sportsman 527,207 acres of shooting ground. In the same year, 34 refuges were open to big-game hunting, to a total of 2 million acres. There were 19 refuges open to upland-game shooting, totaling 100,000 acres of new shooting ground. Including 5,250,000 acres in Alaska, nearly half (7,853,326 acres) of the 17,409,960-acre total of the wildlife refuge program was open to some type of hunting in 1954. Such public shooting grounds are operated by the State fish and game departments under plans mutually agreed upon.

All these are some of the benefits that accrue from the Federal refuge program and represent direct and tangible returns to the duck hunter paying his $2 Federal migratory bird hunting stamp each autumn. Such privileges have not damaged the basic resource or impaired the refuge properties, but represent opportunities that are available and rightfully belong to the sportsmen supporting the program.

Now, what is the present status of the refuge program? A review of the present wholesale demands by special-interest groups and even by careless-thinking conservationists and wildlife lovers will show that these demands pose a devastating threat to the future continuity and integrity of the refuge program. The national wildlife program, having demonstrated its indispensability in the management of North American waterfowl, was never in greater jeopardy from pressure groups.

On practically every acre in the refuge program there has been a request for some private or selfish use. Meanwhile, there is a continuing demand from not only the sportsmen, but from all groups and all people interested in wildlife conservation to expand the program. Fiscal problems have unfortunately kept the Service from buying as much land under the duck-stamp program as it had planned. The relationship of our refuge maintenance moneys to our ability to purchase new areas is sorely out of joint. Today too much of the duck-stamp income has to be spent for maintaining existing and priorly developed refuges, since Congress no longer appropriates any money at all for the upkeep of waterfowl refuges. All of the maintenance of the waterfowl refuges is carried by the hunter purchasing his $2 duck stamp. This is now taking 54 percent of the duck-stamp income. Congress is supplying an annual appropriation of only $836,000 for refuge maintenance, which sum is just enough to maintain the big-game refuges which are the home of remnant big-game herds in danger of disappearing if such areas providing their basic habitat are not maintained.

Fiscal demands on the program are increasing daily. Our refuge dollar is now worth only 50 cents. The post office charges for printing and distributing the migratory bird-hunting stamp have increased tremendously. From the years 1934 through 1951 the charges were $30,000 a year and were probably too low. In 1952 and 1953 the charges were $32,000 per year. But in 1954 the charges jumped to $150,000, and in 1955 increased further to $169,000 and the end is not in sight. Eight bills have been introduced in the Congress this session to earmark 40 to 45 percent of the duck-stamp income for refuge acquisition—this in face of the fact that 54 percent of the present duck-stamp income annually must be used for refuge maintenance. If the Congress acts to earmark the above percentage for land acquisition only, without adjusting its annual appropriation for maintenance, it will result in boarding up all but about 17 percent of the existing 205 refuges for the lack of funds to operate them. You should recall that approximately half of the present waterfowl resource is maintained on these refuges by intensive development and maintenance and by such special game-management devices as the production of agricultural crops to supplement the inadequate natural foods found on the areas.

So, rather than the continuing embalmment which the refuge program now seems to be undergoing, what it really needs is a blood transfusion at the hands of Congress. The Service has received unfair criticism in recent months over its inability to buy more land from duck-stamp funds. It has been overlooked entirely that, while we have purchased only 214,209 acres from this source, at the same time from other funds temporarily available we have secured close to 3 million acres much in need of development to restore the land for waterfowl occupancy. There was an abundance of labor from CCC and WPA sources, but we had no development funds—nothing to buy the steel reinforcement, the cement, the lumber, the caterpillar tractors, the draglines, and all the equipment and materials necessary to build dams and water-control structures necessary to reflood the areas, provide fire lanes and patrol trails, post and fence the areas, and many other expenses necessary in the restoration of the habitat. Our only source was the use of duck-stamp funds to meet this catalytic need, and by so doing we advanced the waterfowl refuge restoration program 18 years over what would have been possible had we used the duck-stamp funds for land purchase exclusively.

Meanwhile, America's hunters and all major conservation agencies are clamoring for more refuges. In 1934 a careful study of our waterfowl resources showed that we had approximately 120 million acres of marsh and wetlands, of which less than 30 million acres of habitat of good quality were then available. The continuing development of navigation, oil, sulfur, agricultural drainage, and other economic factors have further reduced this minimum and are still at work in daily closing out the living space of North America's waterfowl. Based upon the existing waterfowl population and future requirements of the waterfowl resource, it was felt in 1934 that the Federal Government should own and develop 7,500,000 acres of waterfowl land as a minimum requirement for maintaining the waterfowl resources. That estimate has stood the test of time. We are almost halfway to that goal now. We still need the remaining 4 million acres, and they are needed in a much shorter period of time because of the greatly accelerated destruction of waterfowl habitat in our modern economic life and the rapid increase in the number of waterfowl hunters. It is expected that the program can be further agumented through the operation of the Pittman-Robertson program on the part of the States and that they will probably be able to restore 5 million acres of waterfowl habitat. Counting both State and Federal restoration work, then, the waterfowl restoration program should result in 12,500,000 acres of waterfowl habitat in public ownership and maintained for the perpetuation of the resource.

It is estimated that the remaining 4 million acres to be acquired by the Federal Government will average $40 an acre in cost, or $160 million. Development costs will average $20 an acre, or $80 million, making a total of $240 million as the Federal Government's share of the national waterfowl restoration program.

Obviously the duck-stamp income which can be allotted for land purchase in the future will not begin to carry such a program. It is all too evident that the entire duck-stamp income alone would not be sufficient to consummate this program. Thus, if the basic minimum requirements for our national waterfowl resource are to be achieved in time to save this popular resource for succeeding generations, Congress must come to the rescue, as it has in the past, and supplement the duck-stamp moneys for land purchase and development. Bear in mind that we have approximately 2,250,000 hunters now in a population of 165 million people and that by 1975 we shall have 4 million hunters in a population of 200 million people.

Various suggestions have come forth as to how to raise the additional money needed in time to do any good. The first suggestion put forth was the usual one of increasing the cost of the duck stamp to the hunter. However, it is feared that such an increase, say, to $5 as has been proposed, would cause many of the average hunters to give up waterfowl hunting in such numbers as to cancel an anticipated increase. Already the duck hunter is paying his State license, which averages $3, in addition to the $2 Federal migratory bird-hunting stamp; so he is paying as a minimum in most States $5 to hunt waterfowl each autumn. Moreover, he must pay an additional fee if he hunts on State-managed waterfowl areas in order that the State can operate such facilities for his benefit. These fees vary from $1 per hunter in Wisconsin to $3 in Missouri and Florida and up to $5 in California for the privilege of hunting on State waterfowl management areas or those portions of Federal refuge areas open to shooting under State management. True, a wealthy member of a de luxe

duck-hunting club would think nothing of such increased charges; but the rank and file of our waterfowl hunters are made up of citizens of average or lower group incomes, and I am afraid that such increased cost would defeat the purpose of raising more revenue by an increase in the cost of the Federal duck-hunting stamp.

There appears to me only one way out. The sportsman himself, in originally seeking the amendment to the Migratory Bird Hunting Stamp Act in 1949, recognized the problem of increased maintenance costs and, at the same time, wanted an accelerated land-purchase program, to accomplish which he readily agreed to doubling the duck stamp cost to $2. In return for this action he wanted some shooting opportunities in connection with new areas. Thus, the sportsman is carrying more than his share of the load, since our national waterfowl management program is founded upon international treaties with Canada and Mexico, approved and underwritten by the Congress, of which a national waterfowl refuge program is an integral part. But, the Congress has gradually slipped out from under its responsibilities in the maintenance of this program which it has sponsored and authorized.

On the other hand, the Congress has greatly increased certain public facilities—as public roads, Federal aid to State conservation, and other National and State programs (such as public health)—with a matching arrangement. For example, in the case of public roads and in our own Federal aid in Wildlife Restoration Act, the Federal Government matches money with the States for this purpose on the basis of for every 25 cents advanced by the States, the Federal Government puts up 75 cents. And this simple fact alone is why we have such a fine public road system today and why State conservation management and acquisition have caught up and are now exceeding Federal activities. Thus, in recognition of the self-help which the duck hunter is providing, why is it not logical for the Congress to match money with the duck hunter, who is already allowing himself to be taxed $2 per hunter per year? Our present income from the duck stamp is around $4,500,000. If the Congress would match this sum with the duck hunter each year, we would have $9 million annually for the conservation of waterfowl resources and in the next 25 years would probably be able to obtain and preserve all of the land that is going to be available or that we can afford to use for waterfowl conservation purposes in the next 25-year period. This would make Congress' contribution to the program more consistent and stable, to the point where the service would know where it was going with the program and where we could operate with greater efficiency and purpose.

The CHAIRMAN. I thank you very much. You have made a splendid witness. It has been interesting. We have enjoyed it.

We will close this meeting. The next meeting will be Tuesday morning of next week at 10 o'clock.

(Thereupon, at 1 p. m., the committee recessed to reconvene at 10 a. m., Tuesday, March 8, 1955.)

STUDY OF THE OPERATIONS OF THE FISH AND WILDLIFE SERVICE

TUESDAY, MARCH 8, 1955

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D. C.

The committee met at 10:10 a. m., pursuant to recess, in room 219, Old House Office Building, Hon. Herbert C. Bonner (chairman) presiding.

The CHAIRMAN. The committee will come to order.

This morning we will continue with the Fish and Wildlife Service. Who is the witness? Mr. Day?

STATEMENT OF ALBERT M. DAY, ASSISTANT TO THE DIRECTOR, FISH AND WILDLIFE SERVICE—Resumed

Mr. DAY. Mr. Bonner, I am Albert M. Day, Assistant Director of the Fish and Wildlife Service.

Both Mr. Farley and Mr. Suomela, the Assistant Director in Charge of Fisheries, were required to attend another meeting this morning so they asked me to come up and introduce the witness today.

Very briefly, Mr. Farley outlined when we were before you a few days ago the organization of the present Fish and Wildlife Service, the former Bureau of Fisheries, going back to the year 1871, organized in the Department of Commerce, the Biological Survey in 1885 in Agriculture, and consolidated in 1940 to the present Fish and Wildlife Service.

So the old parent agency of the Bureau of Fisheries is really the older of the two segments and has had a very long and fine scientific history.

During the years since 1871 a great deal of exploratory work has been done in the waters surrounding the United States and much aid has been given to the very important fishing industry which has come up throughout these years.

Now, the Government does not attempt to undertake things that the States are doing. The Federal Government has no role in making regulations so far as fisheries are concerned other than in Alaska. The Government's role has been to aid and assist the States and industry in attempting to do a better job for the American fishermen.

Much work has been done in research, as I stated, in all of the oceans surrounding the United States. Much work has been done in the South Pacific, under special legislation passed about 7 or 8 years ago, with headquarters in Hawaii.

Congressman Allen has visited our Hawaiian station and knows the work being done, exploring for new sources of tuna in the vast Pacific.

Much exploratory work has been done with Government vessels, most of them Government surplus, and new sources of fish have been discovered. Jumbo shrimp were discovered in the gulf a few years ago by that research. These vessels are now working in studying tuna resources in the gulf and the Atlantic, and it holds much promise.

We have been working on such things as the spectacular red tide in the Gulf of Mexico. The king-crab resource in Alaska was discovered largely as a result of exploratory work.

Our cooperation in the fisheries field has been very close with State agencies and with other Federal agencies. I might mention that at the present time insofar as regulation, research and a cooperative approach are concerned among the States there are interstate commissions ringing the entire coastal areas of the United States. The Atlantic States Fisheries Commission covers Maine to Florida, with all of those States included. The Gulf Commission covers from Florida to Texas, and the Pacific States Marine Commission the three western States.

The Fish and Wildlife Service works and aids these commissions as much as it can. In the gulf and Atlantic the Service actually performs research work for those commissions. Then there are the international treaties, many of them covering individual commercial resources.

With Canada we have international treaties controlling the sockeye salmon and halibut. We have them with Costa Rica and Mexico in connection with tuna. The great North Pacific Treaty came into being a year ago with Japan and Canada.

The Service works closely with all the treaty Commissions and in some instances actually enforces those regulations. In the States, the Service maintains statistical services and market news offices to do for the fishing industry what is done for the agricultural industry through the Department of Agriculture. We work closely with the Department of Agriculture on all related problems when it comes to handling the fisheries along with other agricultural industries.

The chairman asked me the other day when I was on the witness stand what the value of the American fishery is and I passed that at the moment because I did not have it at my fingertips. The American fishing industry provides around 10 percent per year of the animal protein foods that are used in the country, not only for human consumption but poultry and animal feeds. The fishery has a value at the retail level of about $1 billion and some $350 million at the fishermen's level.

Speaking of the billion dollars, I am speaking of the overall retail value. There are about 160,000 fishermen and 100,000 shore workers and some 300,000 in allied industries such as boat building, so that around a half million people have a direct interest in the fishing industry and, if you consider their families, there are probably close to 2 million people who depend upon the fisheries for their livelihood.

This morning we are presenting two of the major segments of the Service's activities in connection with commercial fisheries. We have two expert witnesses who have been in the Service many, many years

and are highly trained individuals. The first is Dr. Lionel A. Walford, in charge of fishery biological research. The other is Mr. A. W. Anderson, who is in charge of the branch of commercial fisheries.

With your permission, we will move to Dr. Walford, who will tell you about the fishery research work of the Fish and Wildlife Service.

The CHAIRMAN. Mr. Allen?

Mr. ALLEN. Mr. Day, it seems to me that I recall some years ago that the subsidy paid by the Government with regard to fishery products was about 70 or 80 cents as against about $7 for a similar unit paid for agricultural products. Do you know what the figures would reveal now?

Mr. DAY. Do you have that, Mr. Anderson?

Mr. ANDERSON. The figures are a little closer together now. We have worked them out. I think it is a dollar-some on the fisheries and around $7 or $8 on the agriculture. We will be glad to furnish that.

(The information was furnished for the record.)

Production, income taxes, and Federal expenditures for fishermen and farmers

Item	Year	Average fisherman	Average farmer
Production for food.....pounds..	1940	47,000	34,500
Do.....do....	1953	42,220	68,133
Income taxes paid	1951	$314.00	$129.00
Authorized Federal expenditures	1954	$51.12	$267.79
Ratio of Federal expenditures	1954	$1.00	$5.24

Mr. ALLEN. Thank you.

Mr. DAY. Relatively it is much the same spread as a few years ago. Thank you.

Dr. Walford.

STATEMENT OF DR. LIONEL A. WALFORD, CHIEF, BRANCH OF FISHERY BIOLOGY, FISH AND WILDLIFE SERVICE

The CHAIRMAN. Will you give your full name and your background?

Dr. WALFORD. My name is Lionel A. Walford. I am the Chief of the Branch of Fishery Biology of the Fish and Wildlife Service. I started my career as a fishery researcher in 1927 when I joined the State fisheries laboratory of the California division of fish and game. I was with that organization for about 5 years. Then I went for graduate work to Harvard University, doing my thesis work on the oceanic, pelagic phases of the life history of the haddock, a ground fish which is the most valuable one in New England. Subsequently, I joined the Bureau of Fisheries in 1935 and have been with the Federal Government ever since.

Do you mind if I stand, Mr. Bonner?

The CHAIRMAN. Yes, you may stand.

Dr. WALFORD. Now, the fishery function which I am going to point out this morning relates to conservation of the fishery sources. The ideal of conservation which we hold to is full utilization. That is taking the maximum harvests out of the sea that the marine environment is capable of supporting. This necessitates knowing as much about the sea as agriculturists know about the land.

For example, we must know what kinds of animals and plants there are. We must know what quantities there are. We have to know how they affect each other, which ones are predatory, which ones are fodder. We must know which ones are pests, what kinds are weeds, what kinds of plants and animals in the sea are parallel to the weeds of land. We must know how the climate relates to the abundance and distribution of creatures of the sea and how the system of currents relates to it. We have to know how the various kinds of fishes are affected by diseases and how they are affected by chemistry of the water.

Now, Mr. Day has already spoken to you about State and Federal functions. We concentrate on problems which are of international interest or interstate interest, that is, which are beyond the scope of our own Nation or of any State, and all the time we concentrate on the searching for principles of broad application.

I have a chart here showing the geographic scope of our activities. This chart of the United States and Canada is shaded to emphasize the fresh water areas in which we are interested. These green lines represent the rivers and here are the Great Lakes. We have stations along th Atlantic Coast, one at Cortland, N. Y., where a scientific staff is engaged on the study of problems of particular interest to hatcheries, that is, to improving the nutrition in hatcheries. A similar laboratory is in Leetown, W. Va., where we are engaged on the study of problems concerning propagation of warm water fishes. Another station is down in the Shenandoah National Park where our people are working to develop a scientific basis for managing the fishery resources of that area and a similar place is in the Great Smokies.

We have several places around the Great Lakes for the study of the sea lamprey. We have one in Yellowstone National Park where we are engaged in a program similar to that that we have in Shenandoah. In Seattle we are concentrating on diseases of hatchery fish. At Entiat is a fresh water station concerning hatchery problems and another one at Willard and another one in California at Convict Creek.

This chart is shaded to emphasize the areas in which we are interested at sea. This dark orange band represents the continental shelf.

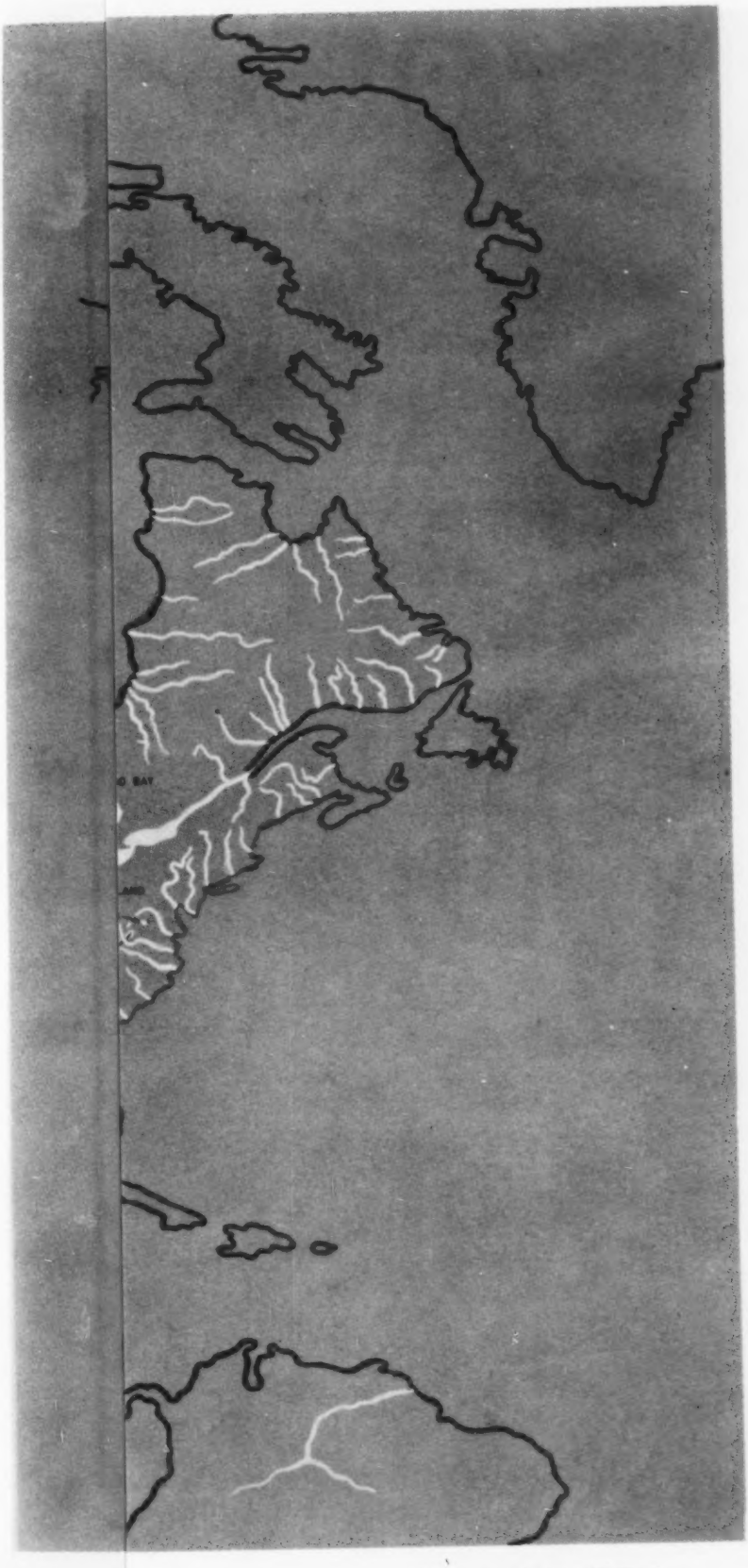
We have programs in New England concerning the ground fishery resources of the New England banks. We extend our activities eastward up to the Newfoundland banks. We extend south as far as about Long Island Sound with another laboratory centered in Brunswick, Ga., engaging in biological studies along the continental shelf along the South Atlantic States.

A similar station is in Galveston, Tex. Another in La Jolla, Calif., is engaged on the study of the sardine problem.

The white area shows the zone in which we are engaged in research on the shellfish resources of the Atlantic coast. We do not carry on such studies in the Pacific coast because that is thoroughly taken up by the States there.

This chart emphasizes the rivers of the Pacific coast where we are engaged in research on the Pacific coast salmon.

Never mind this shaded area because this chart was made for another purpose. I simply want you to see what a vast network of rivers there are. Each river contains not one but many races of salmon so that our research activities must cover a tremendous range here.



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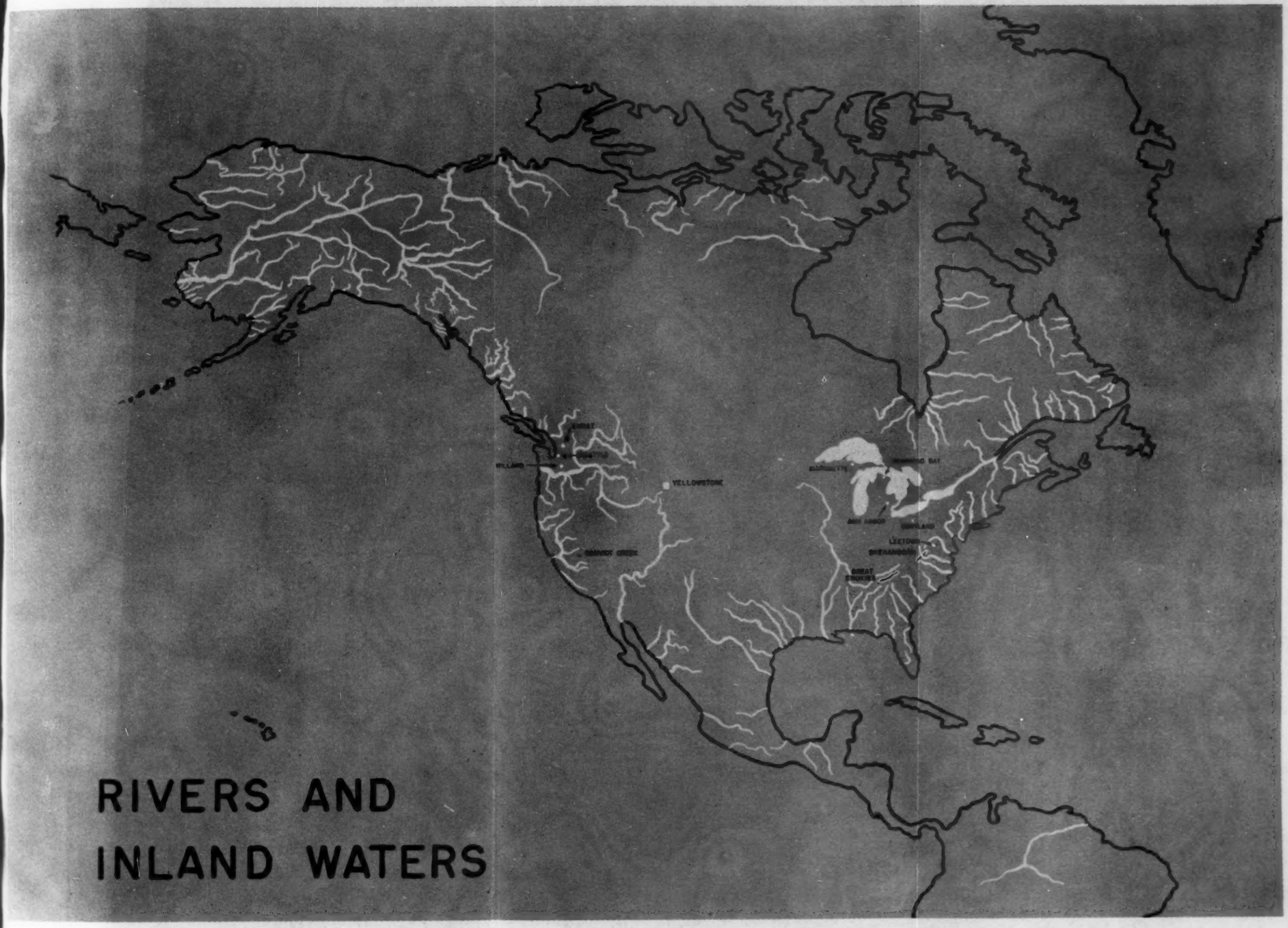

RIVERS AND INLAND WATERS

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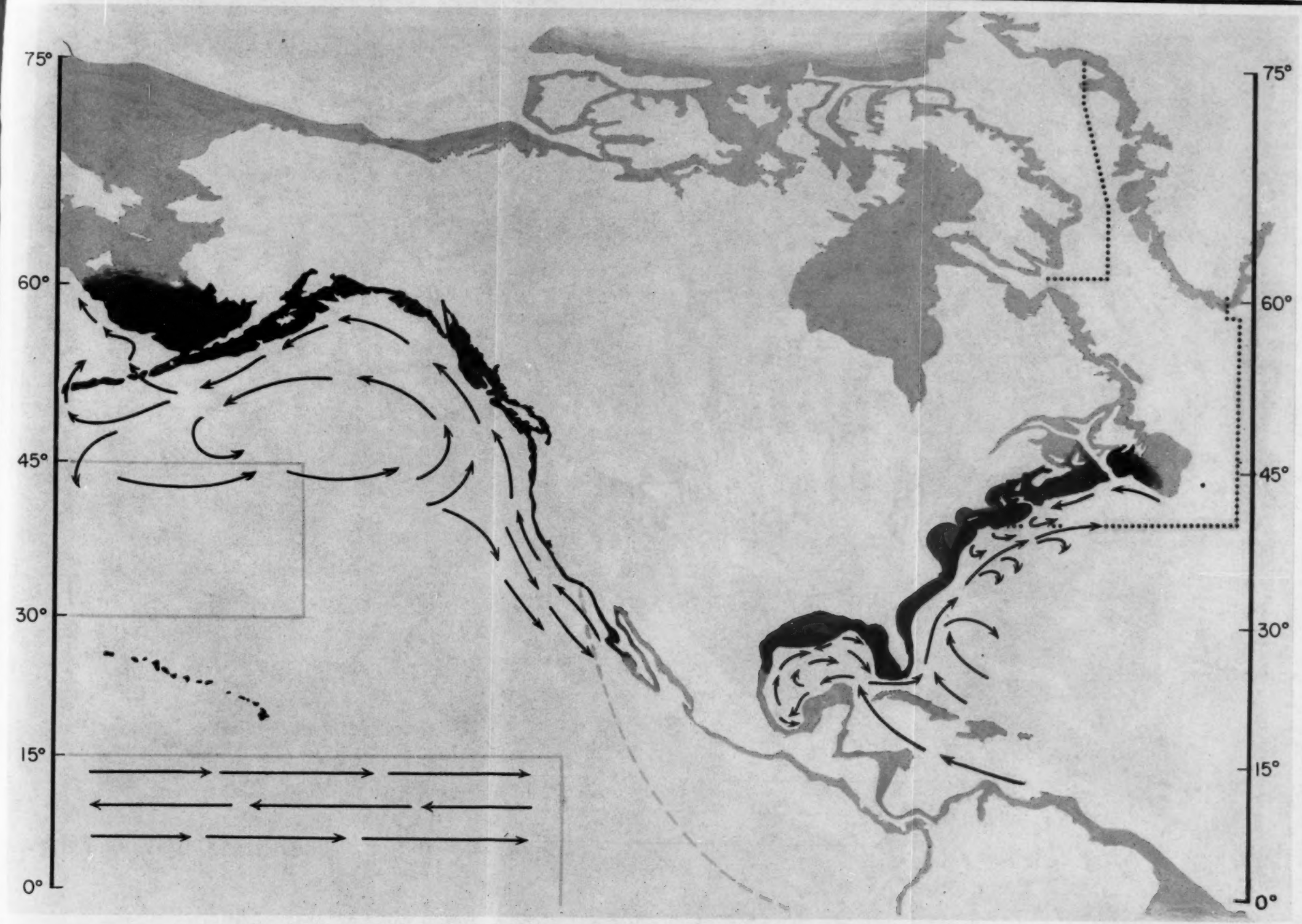

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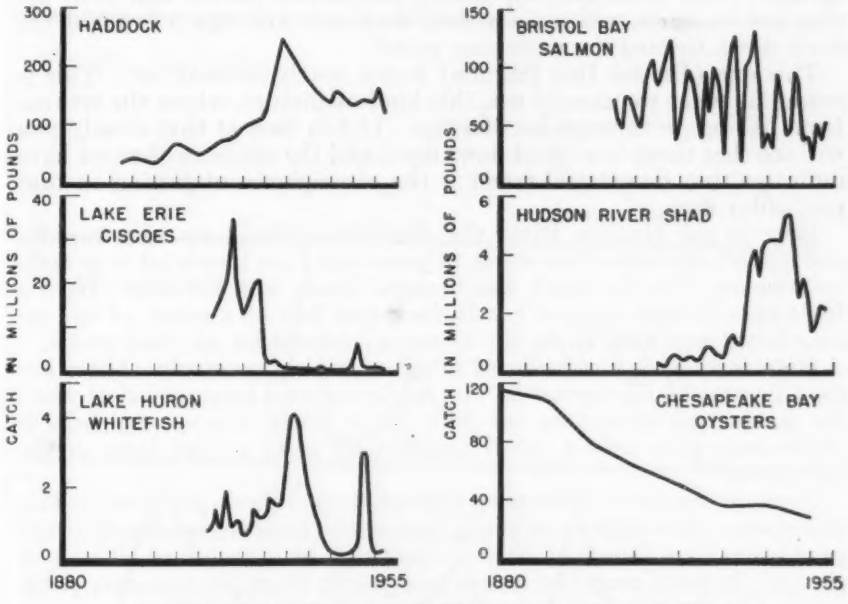
We have several stations in Alaska. Here is Bristol Bay and we have these three down in the States.

The problem with which we were originally preoccupied, that is the most obvious problem that concerns people who are interested in fishery problems, relates to the effect of fishing on the stocks. It was a problem of this sort which led to the origin of the Bureau of Fisheries in 1871 and here are some examples which do show pretty well the effect of fishing on the stocks.

EFFECT OF FISHING



WHEN FISHERMEN FIRST BEGIN FISHING AN UNFISHED STOCK FISHING IS GOOD AND LARGE CATCHES USUALLY RESULT FROM A SMALL AMOUNT OF FISHING EFFORT. AS FISHING CONTINUES, CATCHES BECOME SMALLER FOR THE SAME FISHING TIME BECAUSE OLDER INDIVIDUALS AND ACCUMULATED RESERVES OF FISH ARE REMOVED. THE FISHERY THEN MUST DEPEND UPON ADDITIONS TO THE STOCK THROUGH GROWTH AND THE ENTRANCE OF NEW YEAR BROODS. REMOVAL OF THE ACCUMULATED RESERVE IS A NATURAL RESULT OF FISHING, BUT ONCE THIS CONDITION IS REACHED ONLY THE YEARLY INCREMENT SHOULD BE CAUGHT. THE EFFECT OF FISHING IS SOMETIMES OBSCURED BY VARIATIONS IN ABUNDANCE WHICH RESULT FROM CHANGES IN THE ENVIRONMENT.

Here is a chart showing the catch of haddock in New England, beginning in about 1890. In the beginning it was not a particularly important fish, but with the development of refrigeration methods the fishery grew tremendously and very rapidly, reaching a peak about 1929. At that point the resource began to show the effect of fishing and the catch of fish declined rather precipitantly and it was at that point that the Bureau of Fisheries was asked to begin an investigation.

Now, I will tell you more about that later when I go into the results of the research.

Here is another example in the Great Lakes. The cisco, which is a member of the whitefish family, is a very valuable and splendid fish. A certain kind of net called a bull net, which is a vast gill net, hanging clear from the surface to the bottom, was able to completely wipe out that fishery resource. In the space of a few years it almost wiped out that species. It brought the population down to such a low ebb that it was unable to recover.

Here in about 1943 or so there was some evidence that it was going to recover and the fishing people with their bull nets went out and caught them very rapidly so once again it is down to a low ebb.

This seems to be one of the clearer examples showing the effect of fishing on the fishery stock.

Here is a similar story of the Lake Huron whitefish, which was reduced by a different sort of gear called a deep trap net which was able to have the same effect on the stock. You see how in just a very short span of time, only about 7 years, the stock was reduced to almost the vanishing point. Then after an interval it was able to build up again, and as soon as the fishery people saw that it had built up, they got in again which their deep trap nets and again brought the stock down toward the vanishing point.

This one (Bristol Bay Salmon) is not nearly so clear cut. This is more like what we usually get, this kind of picture, where the returns from fishing go through oscillations. If you look at that closely you will see that there is a trend downward and the evidence that we have indicates that downward trend is the consequence of fishing in that particular area.

Here in the Hudson River the shad fishery built up very rapidly about 1930, carried on for about 10 years and then increased so greatly in intensity that the stock was brought down to a low ebb. Here a little later if there is time I will show you how as a result of our research we are able to bring about a restoration of that stock.

Here is another clear case of effect of fishing on stock. These are the Chesapeake Bay oysters. You see how over a long period of years the production of oysters has gone down, down, down, until here is 1954 when it is only a small fraction of what it had been in the beginning.

Perhaps the most interesting feature about fishery problems is this brood size. The number of young produced varies tremendously every year often by a factor of 10 and sometimes by a factor of 50 and, in general, in most cases the number of young bears no demonstratable relation to the number of spawners.

Here, for example, you see how the brood size of haddock fluctuates quite violently. This has a great deal to do with the stability of fisheries. Fishing is a very uncertain business, as you know, and the more certain we can make it the more we can help the fishing industry.

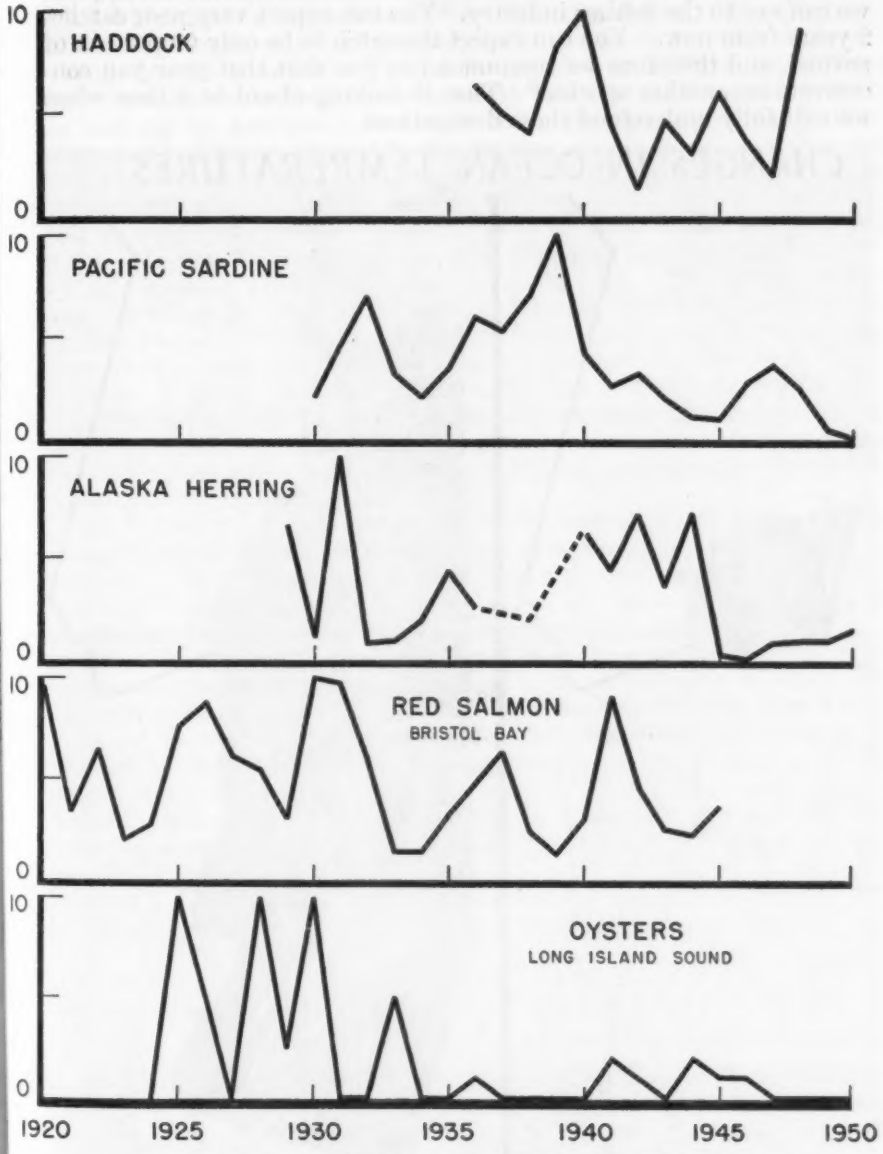
Here is the Pacific sardine. See how the broods vary there. We measured these exactly back to about 1930. The Alaska herring goes through similar fluctuations.

Here is the red salmon. The oysters in Long Island Sound fluctuate more than anything I know of. A good set of oysters comes about once in 9 years.

Our research is largely directed toward finding out what the causes of these fluctuations are because that would enable us to predict catches long ahead of time to fishermen and that would be extremely valuable to them. Under some circumstances it is conceivable that these fluctuations might within limits be controlled.

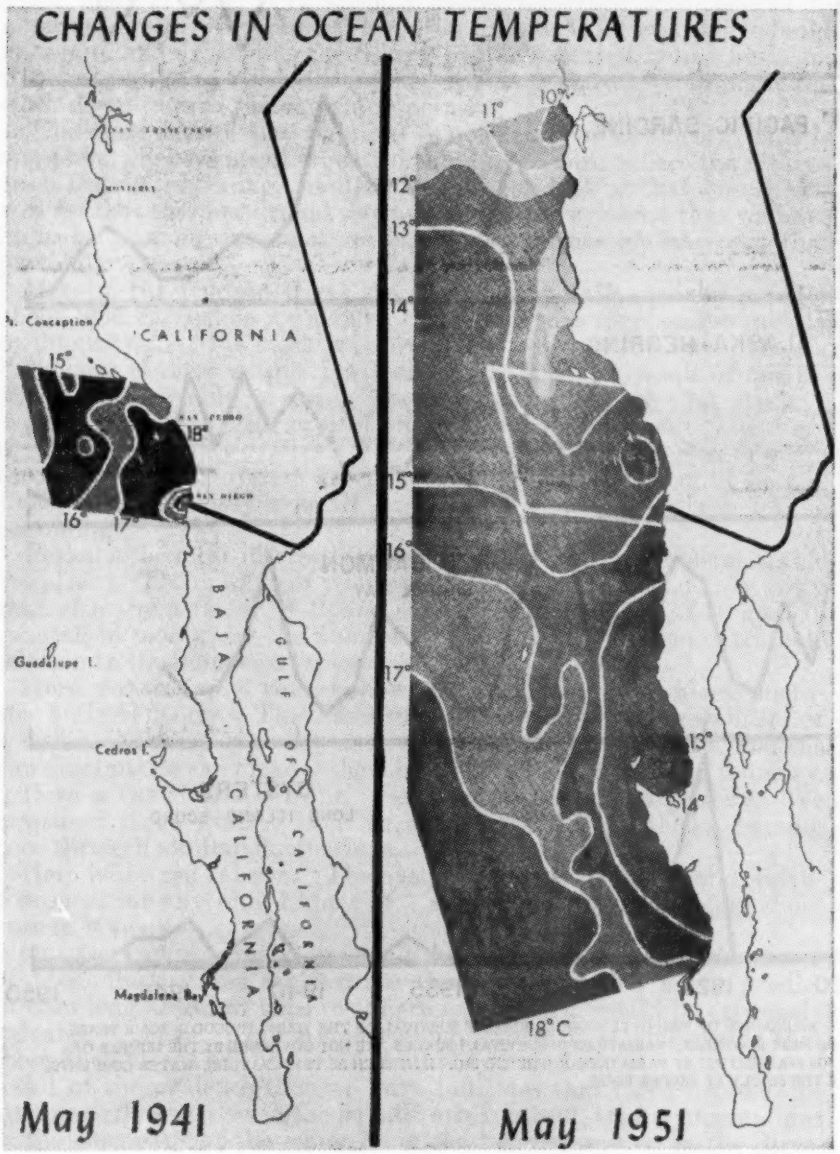
All of the evidence that we have indicates that these fluctuations are due to fluctuations in the aquatic environment, that is, fluctuations in the chemistry of the water or in the temperature or in the direction of currents, or fluctuations in the kinds of animals and plants that occur.

VARIATION IN BROOD SIZE



ABUNDANCE OF FISH OFTEN VARIES BECAUSE SURVIVAL OF THE YOUNG IS GOOD IN SOME YEARS AND POOR IN OTHERS. VARIATIONS IN SURVIVAL USUALLY ARE NOT GOVERNED BY THE NUMBER OF EGGS SPAWNED BUT BY VARIATIONS IN THE ENVIRONMENT SUCH AS TEMPERATURE, WATER CURRENTS, OR THE SUPPLY OF PROPER FOOD

For example, if there were a sudden epidemic which wiped out most of the young this year, that might explain why there had been such a poor catch later. If we can observe that at the time it happens, we can say to the fishing industry, "You can expect very poor catches 2 years from now. You can expect the catch to be only 60 percent of normal, and therefore we recommend to you that that year you concentrate on another species." That is looking ahead to a time when we will fully understand these fluctuations.



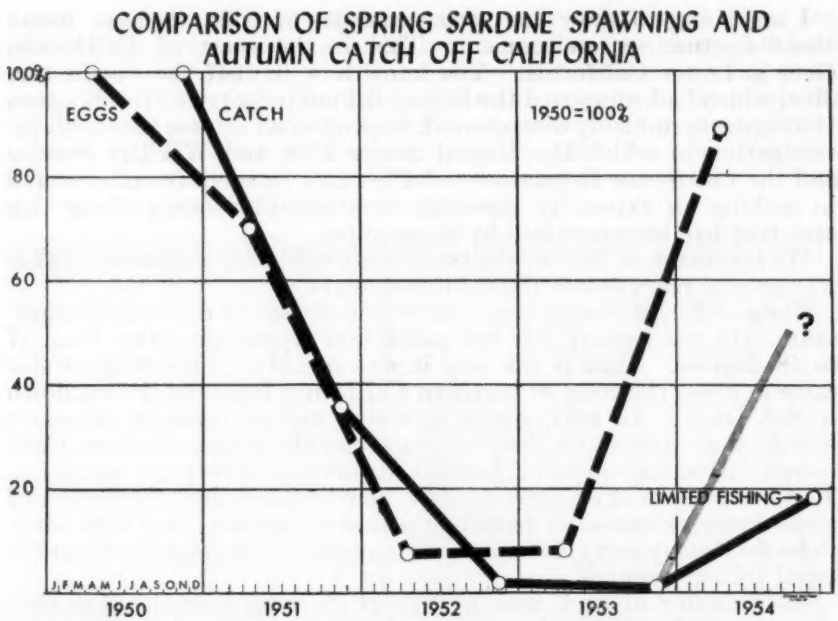
I am going to show you some examples of what we have found about fluctuating environment. This is the coast of California. Here is Lower California. You know how in 1947 the Pacific sardine, which had supported the largest fishing industry of the Western Hemisphere, suddenly disappeared, leading to an intense thorough investigation in which the United States Fish and Wildlife Service and the California Department of Fish and Game have collaborated in making an extremely thorough oceanographic study along this area that had been occupied by the sardine.

We had made in 1941 a very brief study of the hydrography. This was several years before the sardine disaster.

These different shades represent water masses of differing temperature. If you look at this red patch that represents water from 17 to 18 degrees. That is the way it was in 1941. This warm water came in along the coast of southern California from San Pedro down to San Diego. In 1951, a year in which we had made an extensive survey, that same water does not come anywhere near southern California. It is way down off Lower California and very far out to sea. This is one piece of evidence to show how tremendously the system of ocean currents can shift from one period to another, and very often these shifts may carry fishery stocks many, many miles away from the usual fishing grounds.

As a matter of fact, here is a chart showing how the spawning grounds of the sardine have changed in response to changing ocean currents. In 1950 the sardine had spawned clear up as far as northern California. Actually in 1939, which is also a year we know a good deal about, they had spawned clear up to Alaska.

This blue section represents pretty moderate spawning. Twelve percent of the stock spawned north of Lower California in 1950. In the next year 1951, only 3 percent spawned north of Lower California. In 1952 it was 2 percent, and then last year something very interesting happened. The sardine seemed to come back, and the reason they did is that the water mass in which they could spawn moved northward. This gives us some hope that perhaps we are entering a new period for the sardine in which it will again occupy northerly grounds.



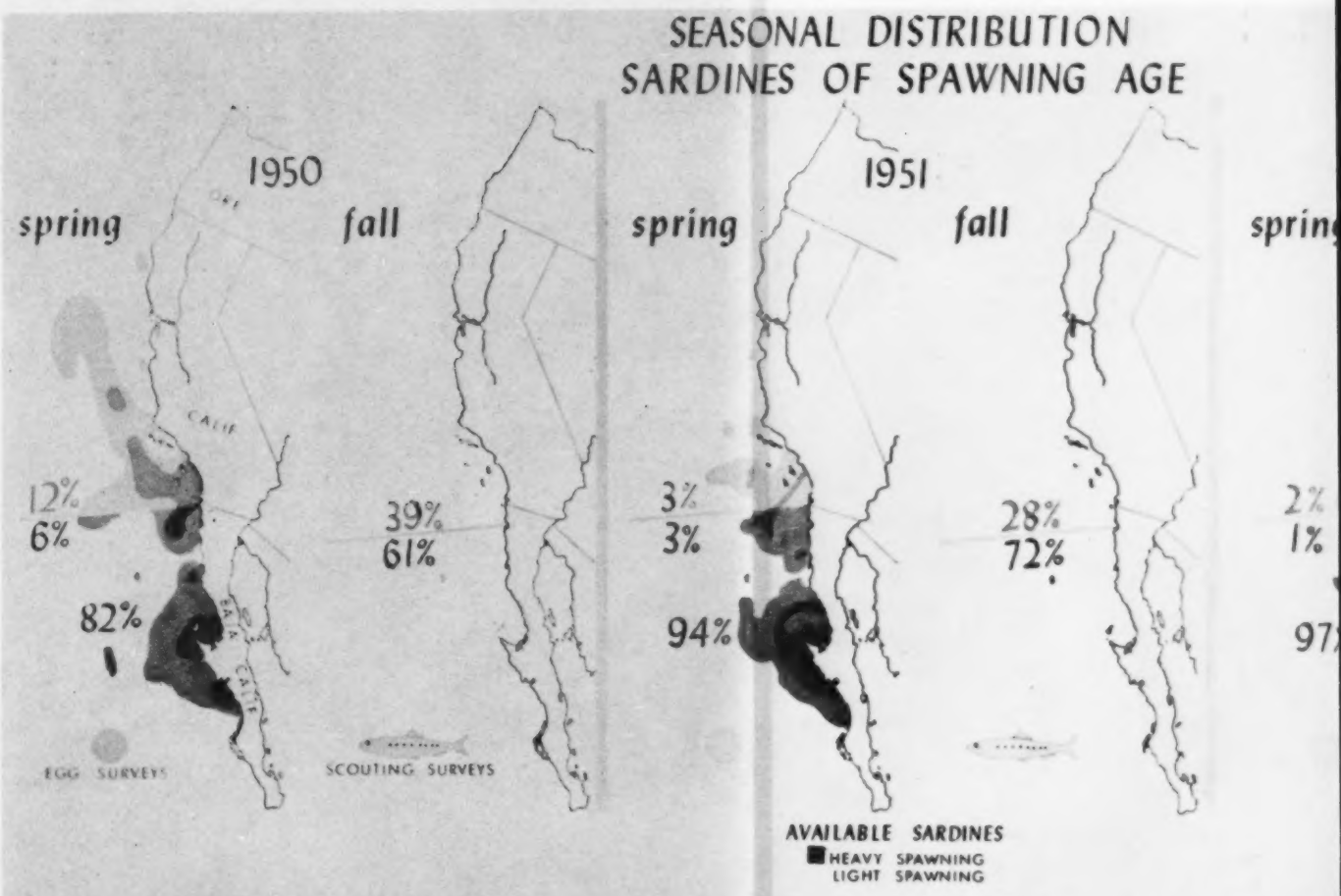
SARDINE SPAWNING INCREASED IN CALIFORNIA WATERS DURING THE SPRING OF 1954 AND WAS 30 TIMES GREATER THAN IN 1952 AND 1953. THE CATCH WAS ALSO GREATER IN 1954 INDICATING THE SARDINES REMAINED IN THE SAME WATERS WHERE THEY SPAWNED. THE CATCH WOULD HAVE INCREASED FURTHER IN 1954 BUT FISHING WAS RESTRICTED BECAUSE OF MARKET CONDITIONS AND PRICE NEGOTIATIONS.

This broken line represents the relative quantity of eggs spawned in California. The solid line represents the catch of sardines in California the following fall. These points representing the spawning zone are in the spring, the catch is in the fall.

You see how closely they are related. In other words, if we find a lot of eggs off California in the spring, the catch is very good in the fall.

Now, among the problems that we have to deal with are those which we call disasters. I think of the sardine disappearance as one disaster. The most recent one we have been working on is the red tide in Florida. We have been working on this red tide problem for several years now, and I think we are beginning to understand it. This first came to our attention in 1947 when an enormous quantity of fish died off the coast of Florida. There was a patch of dead fish about 120 miles long and about 20 miles wide. The stench of their rotting bodies and a peculiar sort of gas which irritated people ashore drove tourists away and this was not merely a disaster affecting all those fish, but also the tourist business in Florida. It was very quickly determined that the cause of the mortality of fish was a swarming of a microscopic creature, which is poisonous. Botanists call it a plant, zoologists call it an animal, and it is something in between the two. It photosynthesizes like plants and it feeds like animals.

The reason that creature is able to swarm there as it does from time to time is that the drainage from the land carries out to sea after periods of unusually wet weather water which is very heavily laden with hydrogen sulfide. The hydrogen sulfide precipitates out



Problem: What is the relation between the distribution of Pacific sardines during the spring spawning season and the fall fishing season?

Procedure: Spawning surveys were conducted from research vessels which were used to tow fine meshed nets to quantitatively sample eggs in the sea. The numbers of eggs collected in the spring were used as an indication of the number and distribution of adult spawning fish. Fish scouting surveys by a cooperating agency, the California Department of Fish and Game, furnished information on the distribution of adult fish during the fall fishing season.

Results: Both the spawning and fi
sardines have been dist
border during recent ye
dency for sardines to m
fall after spawning was

The most recent season
southern California than
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years. The relation be
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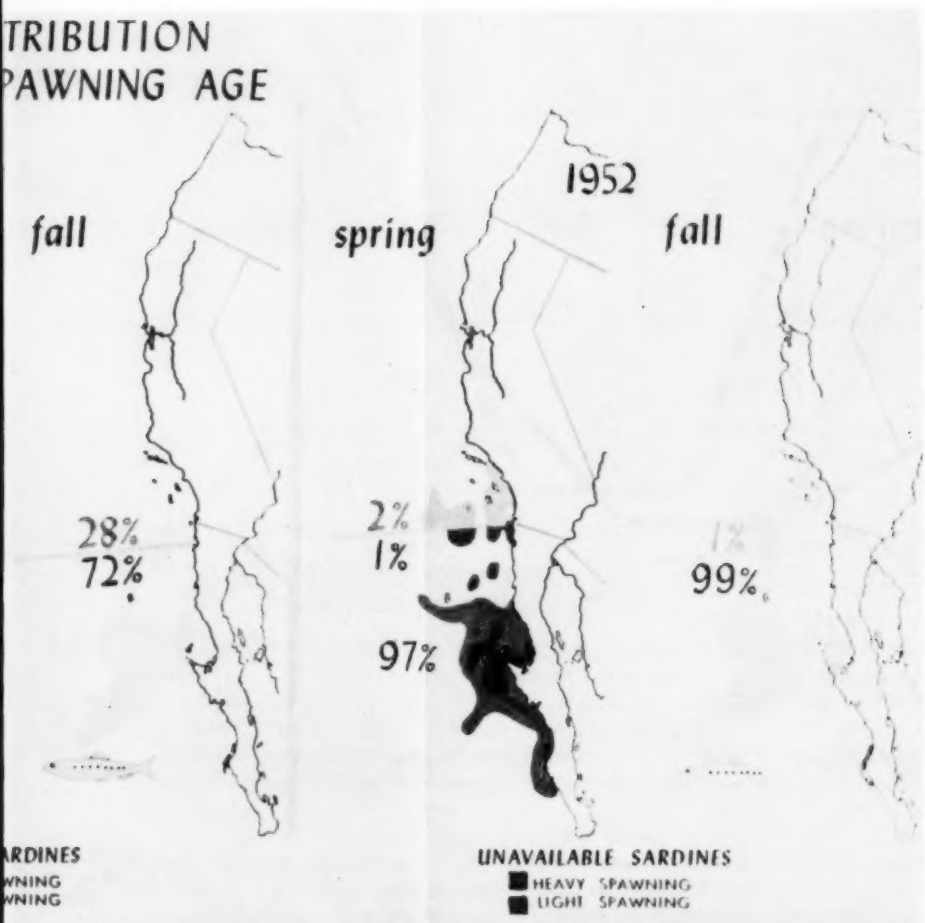
a better catch when spa



Results: Both the spawning and fish scouting surveys indicated that sardines have been distributed mainly south of the Mexican border during recent years although there has been a tendency for sardines to migrate northward in the summer and fall after spawning was completed.

The most recent season (1954-55) had more spawning in southern California than any year since 1948, and the catch in southern California increased greatly over the past two years. The relation between the distribution of spawning fish and the commercial catch the following season indicates a better catch when spawning is increased to the north.

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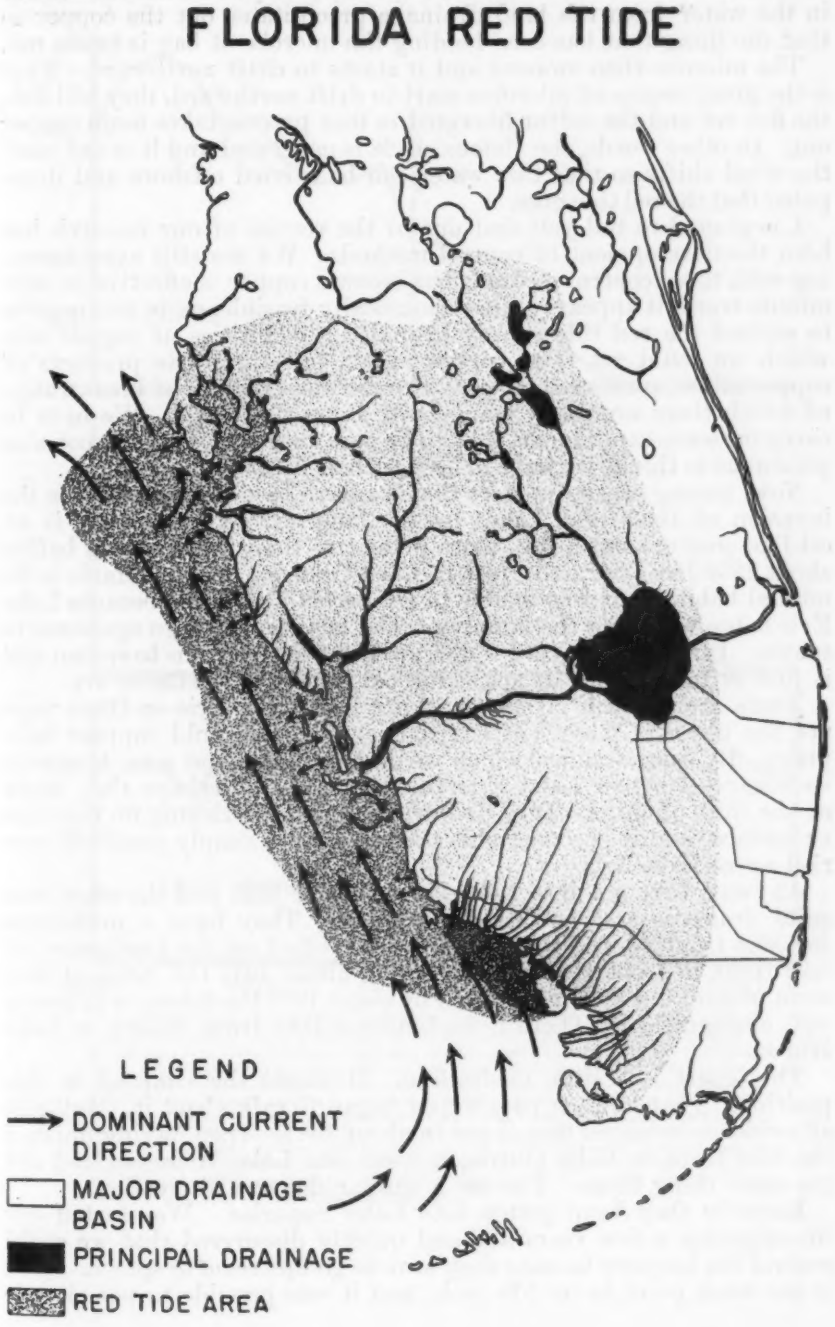
copper. Copper occurs in sea water in the minutest imaginable traces something like two parts per billion. Nevertheless, those two parts per billion we have found is specifically poisonous to this poisonous microbe.



Now, as long as the sea water contains normal amounts of copper that microbe cannot swarm but after a period of prolonged abnormal rain and after a shift in winds, that is if the winds shift from offshore to onshore so that water is in effect piled up and held here, the sulfur in the water from the land drainage precipitates out the copper so that the thing that has been holding the microbe at bay is taken out.

The microbe then swarms and it starts to drift northward. That is the great swarm of microbes start to drift northward, they kill fish, the fish rot and the sulfur liberated in that process takes more copper out. In other words, the vicious circle is generated and it is not until the wind shifts so that this water can be carried offshore and dissipated that the red tide goes.

I neglected to tell you that one of the results of our research has been the development of control methods. We are still experimenting with those control methods but because copper is effective in such minute traces it appears quite economically feasible, quite inexpensive to control the red tide simply by putting quantities of copper ores which we could get from copper mines, just the waste products of copper mines, putting those ores into the construction of breakwaters of which there are many being built along that coast. We have to carry on some experiments first to be sure that the copper is not also poisonous to things we want to keep such as fish.

Now, among other disasters that we have been dealing with is the invasion of the Great Lakes by the lamprey. The lamprey is an eel-like creature not a fish, more primative than fishes, which before about 1930 lived normally just in Lake Ontario. Lake Ontario is its normal habitat. It was unable to get across Lake Erie because Lake Erie is too warm for the lamprey. The lamprey must go upstream to spawn. It must go up cold water, swift flowing streams to spawn and is just as fussy about its spawning environment as salmon are.

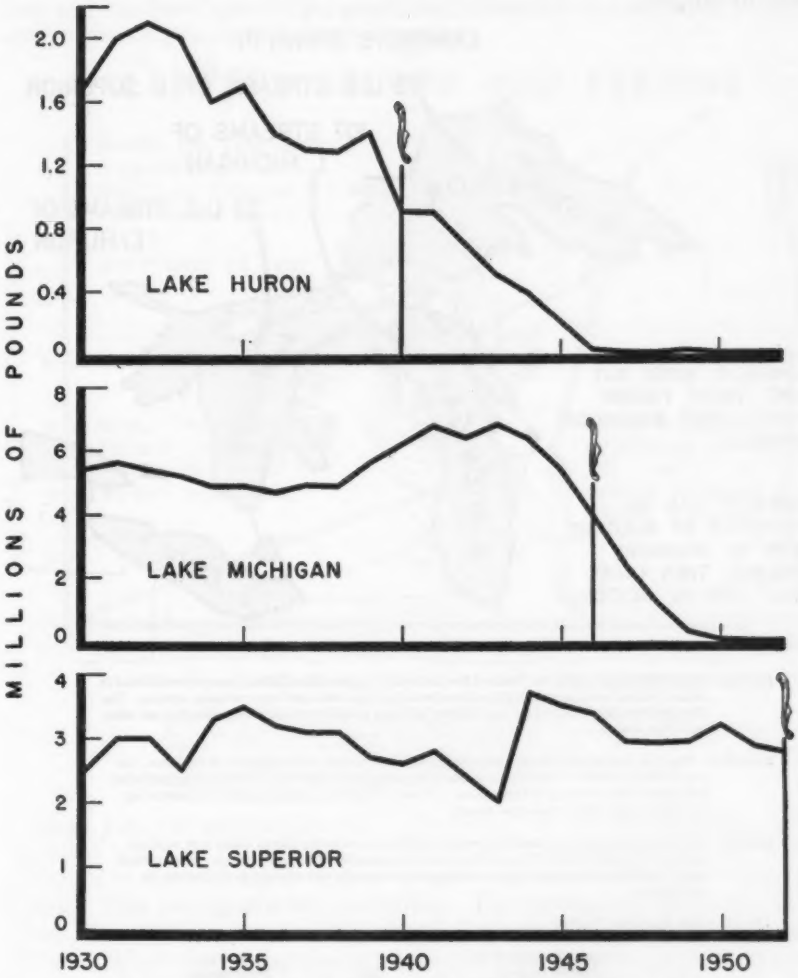
There are no such rivers emptying into Lake Erie so there were not the physical factors of environment which would support lampreys. By some accident which we do not understand some lampreys were carried across Lake Erie in about 1930. Perhaps they stuck on the sides of ships. They do have the habit of sticking on the sides or surfaces and it is conceivable that they were simply passively carried across Lake Erie.

Anyway, they got into Lake Huron about 1933 and the effect was quite dramatic and perfectly disastrous. They have a preference for lake trout as we do, and you see the effect on the production of lake trout in Lake Huron. Beginning about 1931 the catch of lake trout plummeted downward until by about 1946 the fishery was pretty well extinguished. There is no longer a lake trout fishery in Lake Huron.

This chart is a little misleading. It shows the lamprey in this position. That is when people first began to talk about it. Actually all evidence indicates that it got in about 1931. Then having finished the lake trout in Lake Huron, it went into Lake Michigan and did the same thing there. You see a similar downward trend.

Recently they have gotten into Lake Superior. We started our investigation a few years ago and quickly discovered that we could control the lamprey because they have to go upstream to spawn. That is the weak point in its life cycle, and it was possible to put electric

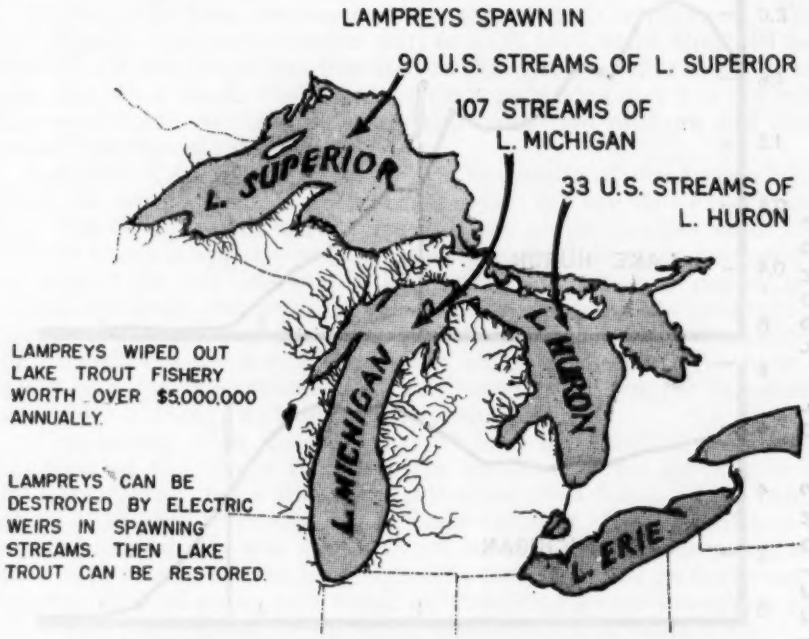
EFFECT OF LAMPREY PREDATION ON LAKE TROUT CATCH



LAKE TROUT ARE NOW VIRTUALLY EXTINCT IN LAKES HURON AND MICHIGAN AND NATURAL RESTORATION WOULD TAKE A LONG TIME. HATCHERY PRODUCTION AND PLANTING APPEAR TO BE THE ONLY PRACTICAL MEANS FOR REHABILITATING THE LAKE TROUT STOCKS IN A REASONABLE TIME. THE REHABILITATION EFFORT CAN NEITHER BEGIN NOR SUCCEED UNTIL COMPLETE SEA LAMPREY CONTROL HAS BEEN UNDERWAY FOR AT LEAST TWO YEARS. THIS IS BECAUSE BETWEEN 4 AND 5 GENERATIONS OF LAMPREYS ARE PRESENT IN EACH STREAM. VERY SMALL LAKE TROUT ARE NOT ATTACKED BY LAMPREYS UNTIL 3 OR 4 YEARS OF AGE. BY STOCKING LAKE TROUT, AT LEAST FOUR YEARS WOULD BE GAINED OVER NATURAL PROPAGATION. EXPERIMENTS ARE UNDERWAY IN LAKE SUPERIOR TO LEARN THE DEGREE OF SURVIVAL OF LAKE TROUT AND THEIR CONTRIBUTION TO THE CATCH AND TO DETERMINE SUCH EFFECTS AS REARING METHODS AND TIME, LOCALITY AND METHOD OF PLANTING. THE ABOVE EXPERIMENTS ARE BASED ON RESULTS OF LAKE TROUT LIFE HISTORY STUDIES RECENTLY COMPLETED

barriers across every stream in which they spawned, and we have now installed quite a number in Lake Superior.

We concentrated there because there was hope of saving that fishery. If we could get the barriers installed in time, then the lamprey would not be able to have the same effect there. We have also several in Lake Michigan.


LAMPREYS SPAWN IN
90 U.S. STREAMS OF L. SUPERIOR
107 STREAMS OF L. MICHIGAN
33 U.S. STREAMS OF L. HURON
L. SUPERIOR
L. MICHIGAN
L. HURON
L. ERIE
LAMPREYS WIPED OUT LAKE TROUT FISHERY WORTH OVER $5,000,000 ANNUALLY.
LAMPREYS CAN BE DESTROYED BY ELECTRIC WEIRS IN SPAWNING STREAMS. THEN LAKE TROUT CAN BE RESTORED.

Problem: Since 1931 the parasitic sea lamprey has invaded the upper Great Lakes, became established in its new habitat and has practically exterminated the lake trout and other valuable species. The chief problem is to control the sea lamprey and then restore the lake trout, whitefish and other important species.

Procedure: The Fish and Wildlife Service has analysed the life history of the lamprey in the lakes, has measured its effect on populations of lake trout and proved that it is definitely responsible for the virtual extermination of that species. It has developed a practical method of controlling the lamprey by means of electric weirs.

Results: Surveys indicate that sea lampreys spawn in 230 streams on the United States side of Great Lakes. Research resulted in the development of a number of control devices. An electrical barrier has been developed which is economical to operate and efficient in controlling the sea lamprey.

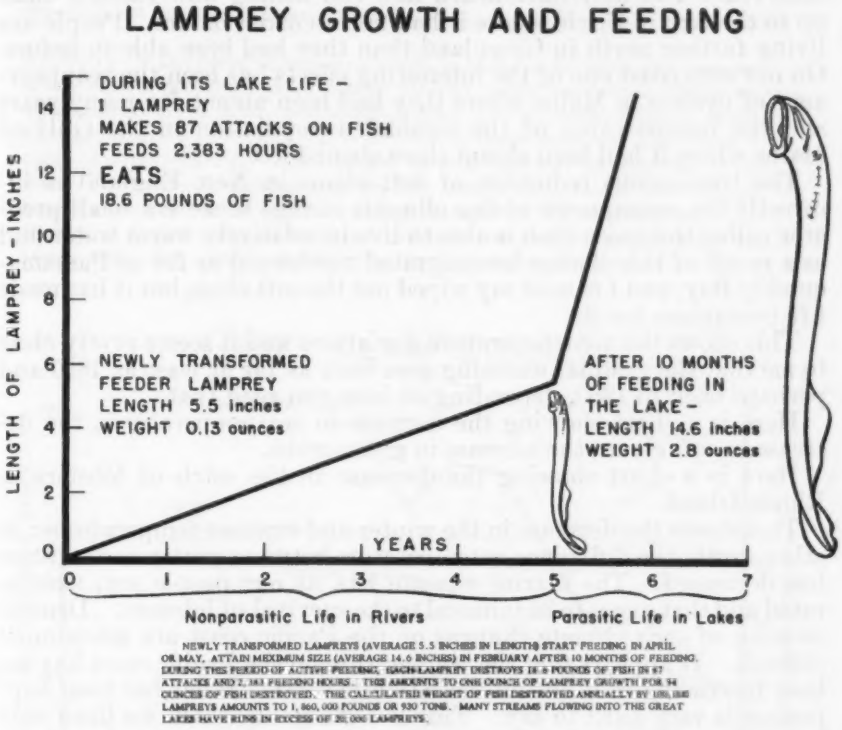
This Much Has Been Done To Date:

	Streams Equipped With Control Devices	Cost	Annual Maintenance
Lake Superior	50	$220,000	$90,000
Lake Michigan	21	85,000	48,000
Lake Huron	--	--	--
Total	71	$305,000	$138,000

This Remains To Be Done:

	No. of Streams To Be Equipped	Cost	Annual Maintenance
Lake Superior	40	$180,000	$170,000
Lake Michigan	86	275,000	240,000
Lake Huron	33	130,000	80,000
Total	159	$585,000	$490,000

Here you can see the size of the problem with which we are dealing. There are 90 streams in Lake Superior in which lampreys can spawn, 107 in Lake Michigan, and 33 in Lake Huron. We have established 50 in Lake Superior and 21 in Lake Michigan and have none in Lake Huron. Canada has likewise become interested in the lamprey problem and has been spending a good deal of money in a research program and in starting to install electric barriers.


LAMPREY GROWTH AND FEEDING
DURING ITS LAKE LIFE –
1 LAMPREY
MAKES 87 ATTACKS ON FISH
FEEDS 2,383 HOURS
EATS
18.6 POUNDS OF FISH
LENGTH OF LAMPREY - INCHES
14
12
10
8
6
4
2
0
NEWLY TRANSFORMED
FEEDER LAMPREY
LENGTH 5.5 inches
WEIGHT 0.13 ounces
AFTER 10 MONTHS
OF FEEDING IN
THE LAKE –
LENGTH 14.6 inches
WEIGHT 2.8 ounces
YEARS
0
1
2
3
4
5
6
7
Nonparasitic Life in Rivers
Parasitic Life in Lakes
NEWLY TRANSFORMED LAMPREYS (AVERAGE 5.5 INCHES IN LENGTH) START FEEDING IN APRIL OR MAY, ATTAIN MEXIMUM SIZE (AVERAGE 14.6 INCHES) IN FEBRUARY AFTER 10 MONTHS OF FEEDING. DURING THIS PERIOD OF ACTIVE FEEDING, EACH LAMPREY DESTROYS 18.6 POUNDS OF FISH IN 87 ATTACKS AND 2, 383 FEEDING HOURS. THIS AMOUNTS TO ONE OUNCE OF LAMPREY GROWTH FOR 34 OUNCES OF FISH DESTROYED. THE CALCULATED WEIGHT OF FISH DESTROYED ANNUALLY BY 100, 000 LAMPREYS AMOUNTS TO 1, 860, 000 POUNDS OR 930 TONS. MANY STREAMS FLOWING INTO THE GREAT LAKES HAVE RUNS IN EXCESS OF 20, 000 LAMPREYS.

Here you can see in this chart the life cycle of the lamprey. They spend 5 years in the stream. First of all the adults go upstream to spawn and deposit their eggs in gravel just as salmon do. The eggs hatch. The young are not parasitic. The young are quite harmless. They live in the stream for about 5 years. They are very small things. Then they migrate down to the lakes just as salmon migrate down to sea. They grow very, very rapidly. They live in the lake for 18 months and then go back upstream to spawn. During its life in the lake the lamprey will make something like 87 attacks on fish and feed 2,000 hours and eat something like 18 pounds of fish.

Here is a specimen of a rainbow trout, showing some scars on it. You can see this lamprey, its teeth and sucking mouth. Once a fish gets it on it cannot shake it off. Large fish are able to endure more than one attack. This did not kill every specimen but a fish that has been attacked once is very susceptible to disease and predation by other kinds of aquatic creatures and, anyhow, generally after 4 or 5 attacks a big fish cannot take any more and succumbs.

One of the very interesting things which we have been studying is the change of climate. This is in some ways another disaster. There have been very curious changes in the distribution of fishes on the Atlantic coast and these we have been able to associate with an extraordinary change of climate that is taking place.

This is of great interest to fishery people along our Atlantic coast and also to fishery people in Europe where the same effect has been observed. You may have heard how cod fishing now extends clear up to the Arctic Circle where it had not occurred before. People are living farther north in Greenland than they had been able to before. On our own coast one of the interesting effects has been the reappearance of oysters in Maine where they had been absent for many years and the reappearance of the menhaden population in the Gulf of Maine where it had been absent since about 1880.

The tremendous reduction of soft clams in New England is indirectly the consequence of this climatic change because a small predator called the green crab is able to live in relatively warm water and as a result of this change has migrated northward as far as Passamaquoddy Bay, and I cannot say wiped out the soft clam, but it has made life precarious for it.

This shows the air-temperature deviations and it seems pretty clear to me that the gradual warming goes back as far at least as 1890 and perhaps back to 1860, depending on how you read that.

Here is a chart showing the increase in sea temperatures, the decrease in soft clams, the increase in green crabs.

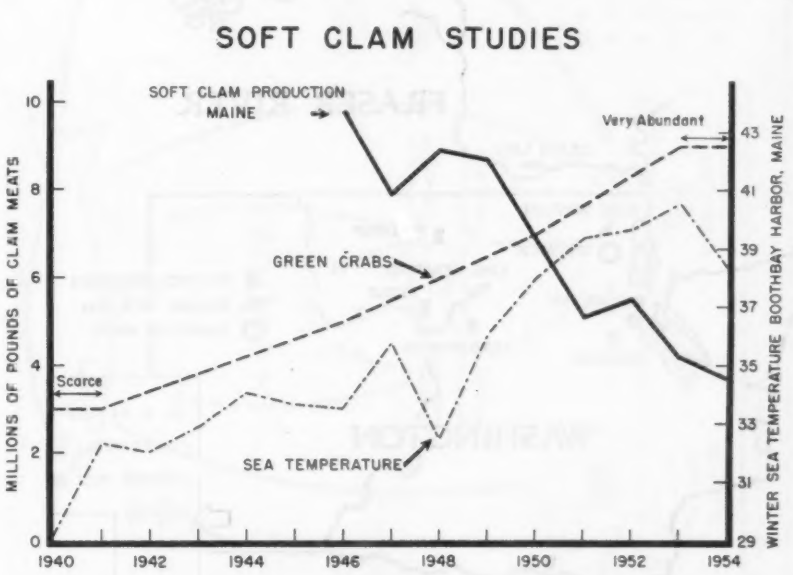
Here is a chart showing the decrease in the catch of lobsters in Rhode Island.

This shows the decrease in the winter and summer temperatures; in other words, the difference in temperature between winter and summer has decreased. The marine climate has, as our people say, ameliorated and that seems to be inimical to the survival of lobsters. Demonstration of such climate changes on the Pacific coast are much more difficult. It appears that the temperature on the Pacific coast has not been increasing as it has on the Atlantic coast. What has been happening is very hard to say. This is a study on which we have only begun the attack and so I can only show you this scrap of evidence to suggest that there is a relation between climate and abundance of fishes.

PROBLEM - - Determine causes of depletion of soft-shell clams and recommend measures for increasing production. Service authorized in 1948 to conduct necessary investigations.

PROCEDURE - - Research teams sent to Me., Mass., R. I., Conn. and N. J. to investigate causes of clam scarcity. Clam farming tried as method of increasing production. One bay studied intensively to determine how many clams can be removed annually without overfishing. Predators, parasites, diseases and reproduction investigated.

RESULTS - - Decrease in clam production in Maine correlated with increase in numbers of predatory green crabs. Similar production drop in Massachusetts, which had occurred before our investigations, also believed caused by crabs. Increase in green crabs and northward shift in range permitted by present cycle of warm winters. Production can be increased by: (1) controlling predators, (2) improving management methods, and (3) reversal of weather cycle. Low wire fences will exclude crabs from clam farms but are expensive. Electrical control being investigated. Cooperative management program with Maine under way. Effect of cold water on crabs being studied.



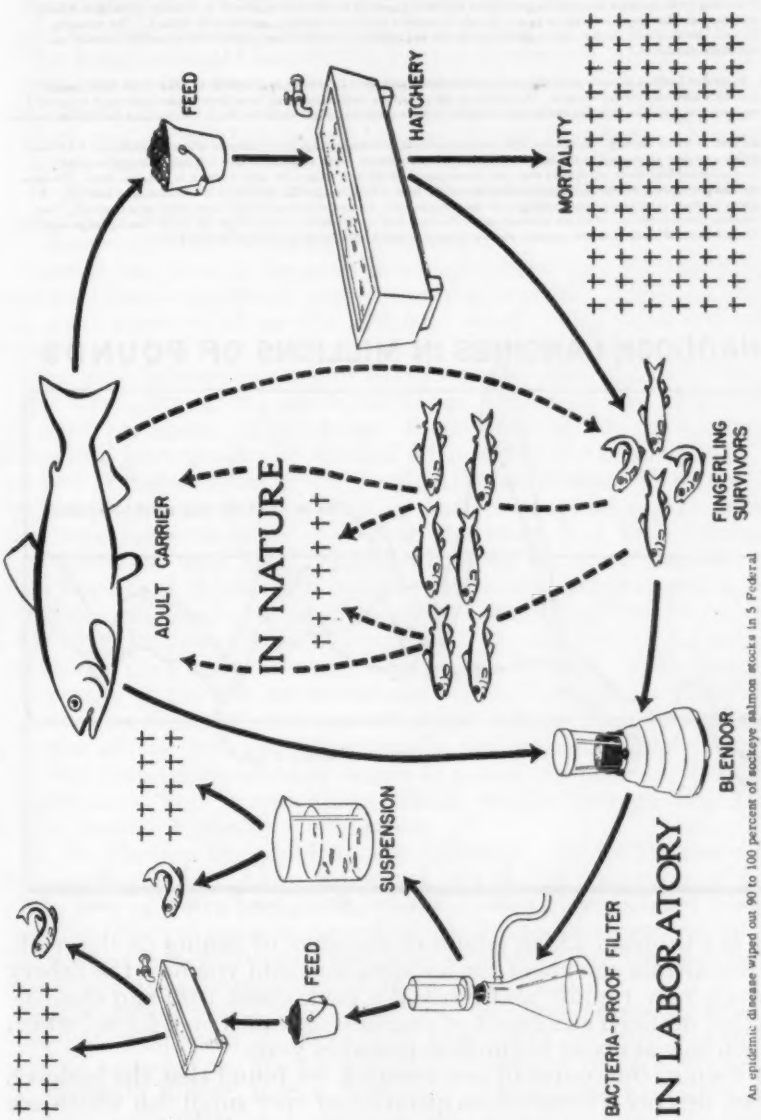
This green curve here represents the temperature in Washington and you see that there has been a cycle in here and this black curve shows the production of red salmon in Bristol Bay, Alaska. That is a long way away, and I would not expect the association to be too significant. I had it made just to show you what hint we have that there is an association.

I am still on disasters affecting fish. There has been another one. This one relates to the Pacific salmon. About 3 or 4 years ago a mysterious disease broke out in our hatcheries and also in some of the State hatcheries in Washington. We immediately intensified our research on disease problems there and in the course of time our people succeeded in identifying this disease as a virus; so fish have viruses as people do. This virus was so destructive that it was able to wipe out as much as 90 percent of the salmon fingerlings in those hatcheries. It was an extremely destructive thing.

Well, after more research we discovered that the virus had gotten in through the food. We had been feeding the hatchery fish with

raw salmon viscera which we had bought from the fish markets. This was a rather cheap food. It was the salmon viscera that carried the virus.

Then more research followed. This disease evidently occurs in nature and in nature also is often destructive. There have been very large mortalities of salmon fingerlings at Kodiak Island in Alaska and at Chignik. We learned this in old references in literature and from oldtimers up there whose descriptions of the symptoms tallied with the symptoms we observed in hatcheries.



An epidemic disease wiped out 90 to 100 percent of sockeye salmon stocks in 5 Federal and State hatcheries in Washington. Some survivors left with spinal curvature.

Appropriations, $30,000 annually since 1954. Have established a team of 2 principal scientists with assistants to study disease and devise prophylaxis. This team has identified the disease as a virus; found that wild adult salmon in several areas in Washington, Canada and Alaska are carriers; traced its origin in hatcheries to salmon viscera in the diet fed the fish; determined that survivors are carriers which can transmit the disease. The team is establishing pattern of infection in nature and experimenting with control measures.

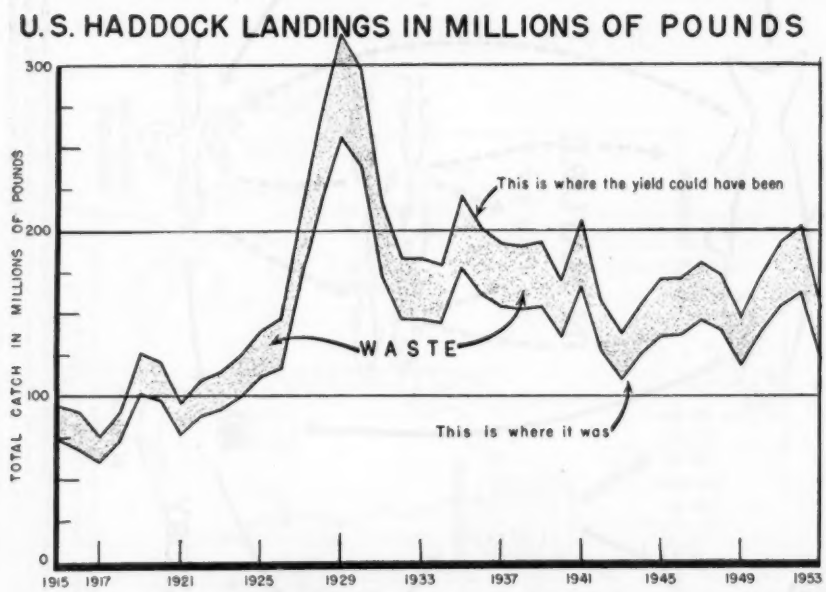
This disease is rather like poliomyelitis, leaving the salmon with curvature of the spine. We are able to control this disease in the hatcheries by practicing hygienic measures, by being very careful to see that all food is treated to destroy infection. Nevertheless, this is a problem now that we must consider as having a great deal to do with the fluctuations and survival of salmon.

Problem: Until recently haddock fishermen on Georges Bank fished with nets which captured large quantities of small, unmarketable haddock along with the larger fish which composed the desirable catch. The small fish were separated from the larger and were discarded at sea. Each year millions of haddock were wasted by such unsound fishing practices.

Following 1930, haddock landings dropped from 250 million pounds to 150 million pounds as a result of the poor fishing practices and failure of a series of yearly broods to produce previously normal quantities of haddock. The industry became alarmed over the decreased abundance of fish and urgently requested that research be started to develop conservation measures.

Procedure: Studies of haddock growth, mortality and reproduction rates were conducted by sampling haddock of all sizes caught by research and commercial vessels. The optimum age of capture was determined from these studies and mesh selectivity experiments were conducted to determine if larger haddock could be caught while the small fish escaped through the meshes.

Results: On June 1, 1953, through cooperation with the International Commission for the Northwest Atlantic Fisheries, 4 1/2-inch mesh nets were first used by the New England haddock fishermen. This mesh is about 1 1/2 inches larger in inside measurement than those previously used and allows small haddock to escape for later capture at a larger size. The nets with larger meshes produced larger catches during the first year of use, while saving 12 1/2 million baby haddock. A group of study vessels continued fishing with the old type nets, so that effects of the new nets could be measured. Two benefits result from use of larger meshed nets. The new gear is 10% more efficient than the old for taking large haddock. Conservation of small fish will produce about 25% more haddock without an increase in fishing effort.



Here is a problem which relates to the effect of fishing on the stock. I told you awhile ago about the haddock and told you how the fishery had grown very rapidly and reached a peak about 1929 and then the production declined as a result of overfishing, and struck a level which was down here at about 150 million pounds a year.

Now then in the course of our research we found that the haddock fishermen destroy a tremendous quantity of very small fish which are unmarketable. They fish for haddock with a net called an outer trawl, which is dragged along the bottom and it takes in everything in the

path. The meshes of the net were less than 3 inches and the small haddock of only a few months of age up to a year were also caught. They had absolutely no value commercially and were destroyed.

This shaded section indicates the quantity destroyed. At this peak year that runs to about 60 million pounds.

Now, by simply enlarging the meshes of the net from about 2¾ inches to 4½ inches that waste could be obviated and those little fish would be permitted to grow to marketable size and just doing that much could increase the catch of haddock by about 25 percent.

At a later step if we were to increase the mesh a little further, we could increase the catch still more. As a result of the recommendation of the International Commission for the Northwest Atlantic this regulation has at last been put into effect and we have had 1 year of it. We are watching the effect of the regulation very closely.

Here you see what the effect has been in the first year. The amount of waste has been reduced by about 80 percent. We expect that the next effect of the regulation, that is the increase in average catch will begin to be felt about this time next year. This is a matter which we are observing with the greatest of interest.

Here is one piece of research in which I think you may be interested because this is one which your committee started. This is a study of the shad resource along the Atlantic coast. This does not concern disaster, but is a problem that relates I think almost entirely to overfishing and the question is how to correct the effect of the fishing.

We have, during the last 5 years, had a team of men concentrating on shad problems. They began their work up in the Connecticut River and have gradually worked down along the whole coast. They are now engaged down in the South Atlantic States. They started in the North because the statistics on shad were particularly good and they were able to piece out what the story had been by examining statistics and such biological facts as they needed, going clear back to, I think, 1900 or even earlier so that they are now able to predict the runs of shad up to within something like 10 percent of accuracy. It is an extraordinary thing. In the Connecticut and Hudson Rivers they know how many fish are in the run. They know what percentage of the fish are in the run. They have made recommendations to the State for the control of the fishery in order to improve the size of the run and consequently the productivity of the stock and the States have already begun to act on the basis of their recommendation. This is something which we do through the Atlantic States Marine Fisheries Commission.

In the Hudson the problems are different. In the Delaware River the problem is one of the pollution. There the spawning of the fish is not very effective because the river is so heavily polluted in critical areas that the young cannot survive, but this too is a problem on which the States are working and which we believe will in the course of not very much time be completely corrected.

South of Delaware Bay we have been able to estimate the size of the runs and what must be done from now on to improve the statistics on shad and that we are encouraging the States to do again through the Atlantic States Marine Fisheries Commission and after a few years of the collection of such statistics we will have a firm basis for managing the fisheries.

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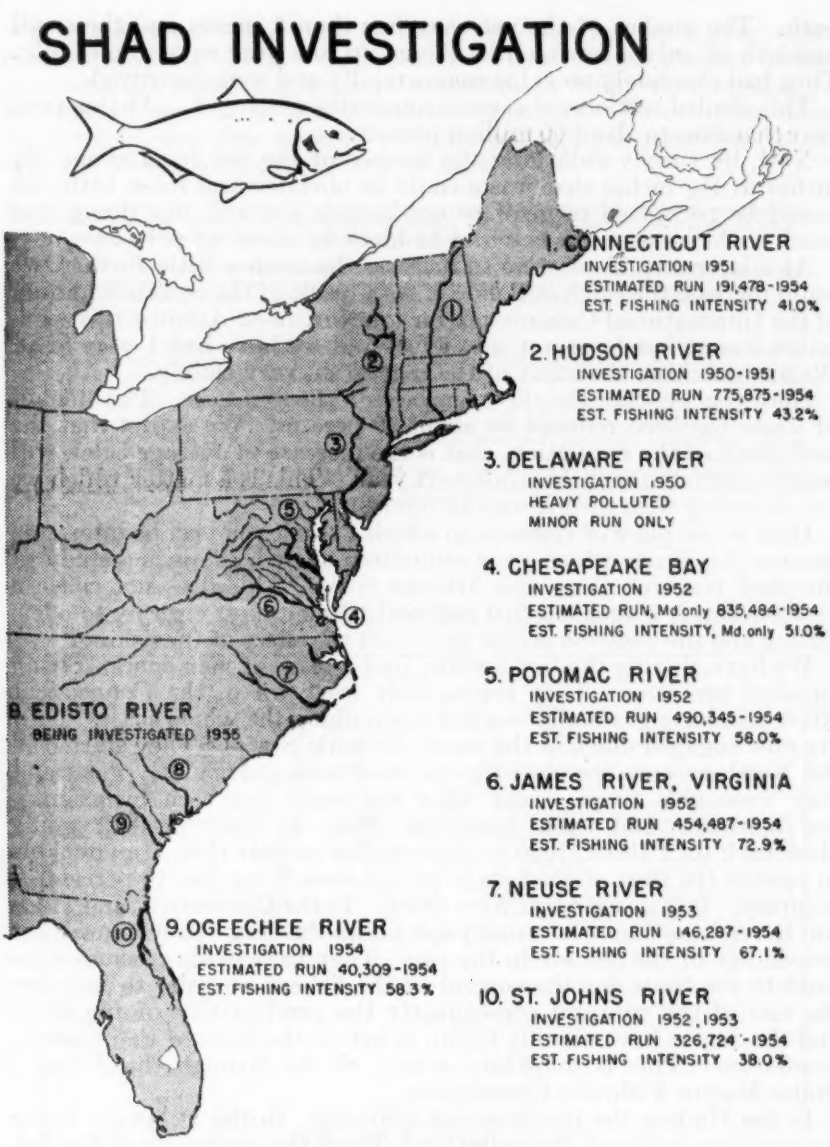


(The shad investigation data is as follows.)

Shad Investigation

The shad investigation began in 1950 at the request of the Atlantic States Marine Fisheries Commission. At that time the catch of Atlantic coast shad had declined to one-sixth of the peak catch made in 1896. The objectives of this project are (1) to discover the underlying causes of the decline, (2) to determine factors favoring recovery, and (3) to provide information for proper scientific management of the fishery.

The original schedule of work is being carried out. Our research began on the Hudson River in the spring of 1950 and at the present time field work has been carried out on the Hudson, Connecticut, Delaware, Neuse (North Carolina),

Ogeechee (Georgia), and St. Johns (Florida) Rivers, as well as in Chesapeake Bay and several of its tributaries. A summary of the findings is given on the attached chart. The Edisto River (South Carolina) is being investigated in 1955.

In order to make most effective use of funds and personnel work has been concentrated in one stream at a time. Because of this the data collected on each river has covered only one or two seasons. Despite this we have had notable success in predicting runs and recommending regulations on the Connecticut and Hudson Rivers, where the States involved have maintained statistical data relating to the shad catch for a series of years, and we have also been able to follow the trends of the shad fishery in the Maryland section of Chesapeake Bay for the years in which statistics are available. No such statistical data are available for the shad runs of the other streams, and therefore we have been unable to realize the full value of the research work done on them.

We have found that adequate statistics can be collected from the shad fishery of the St. Johns River in Florida, the Ogeechee River in Georgia, the Edisto River in South Carolina, and the Neuse River in North Carolina. We will continue to collect statistics on these streams during the course of field work on other streams.

Plans for future investigation include:

1. Continuing the study of the population dynamics of the Hudson and Connecticut Rivers from data furnished by the States of New York and New Jersey, so that the current status of these rivers will be known each year.
2. Determining the effect of ocean shad catches on the catches made in the rivers and determining natural mortalities in the ocean.
3. Continuing the collection and study of catch statistics from the St. Johns, Ogeechee, Edisto, and Neuse Rivers so that management regulations can be recommended for these rivers as has been done on the Hudson and Connecticut.
4. Continue the study of shad passage at fishways. Dam construction continues to threaten many of our present shad runs. Much knowledge has been gained during this present study concerning the passing of this species over these obstructions, but more is needed to insure protection of the runs.
5. Investigate the possibility of restocking several former shad streams which are now barren, and restock if found suitable.

I notice that it is 11 o'clock. Shall I stop at this point so that Mr. Anderson can go on?

The CHAIRMAN. Sir, I did not set any time.

Mr. Day, what is your program?

Mr. DAY. I think if it meets the pleasure of the committee it might be well to let Mr. Anderson come on at about this point. He can take 30 minutes or so and that will leave a period for questioning if you wish to adjourn at 12 o'clock.

The CHAIRMAN. There is one question in which I was interested before you leave.

You were speaking of this type of fishing that is done with respect to haddock, this bottom trawling. What are you doing with respect to similar fishing for shrimp that is destroying all the fish?

Dr. WALFORD. In the Gulf of Mexico?

The CHAIRMAN. Wherever they fish for shrimp.

Dr. WALFORD. We are not involved in this problem yet. We have just started an investigation of shrimp.

The CHAIRMAN. You know that in the taking of shrimp they do destroy all other types of small fish, and the waste is enormous.

Dr. WALFORD. We have just started a shrimp study with Saltonstall-Kennedy funds.

The CHAIRMAN. Who is going to discuss the Saltonstall funds and the program under them?

Dr. WALFORD. I can do that for the biological side of it.

Mr. DAY. Both of these gentlemen are involved in the Saltonstall program.

The CHAIRMAN. All right, Mr. Day.

Mr. DAY. We will call on Mr. Anderson in charge of the Branch of Commercial Fisheries.

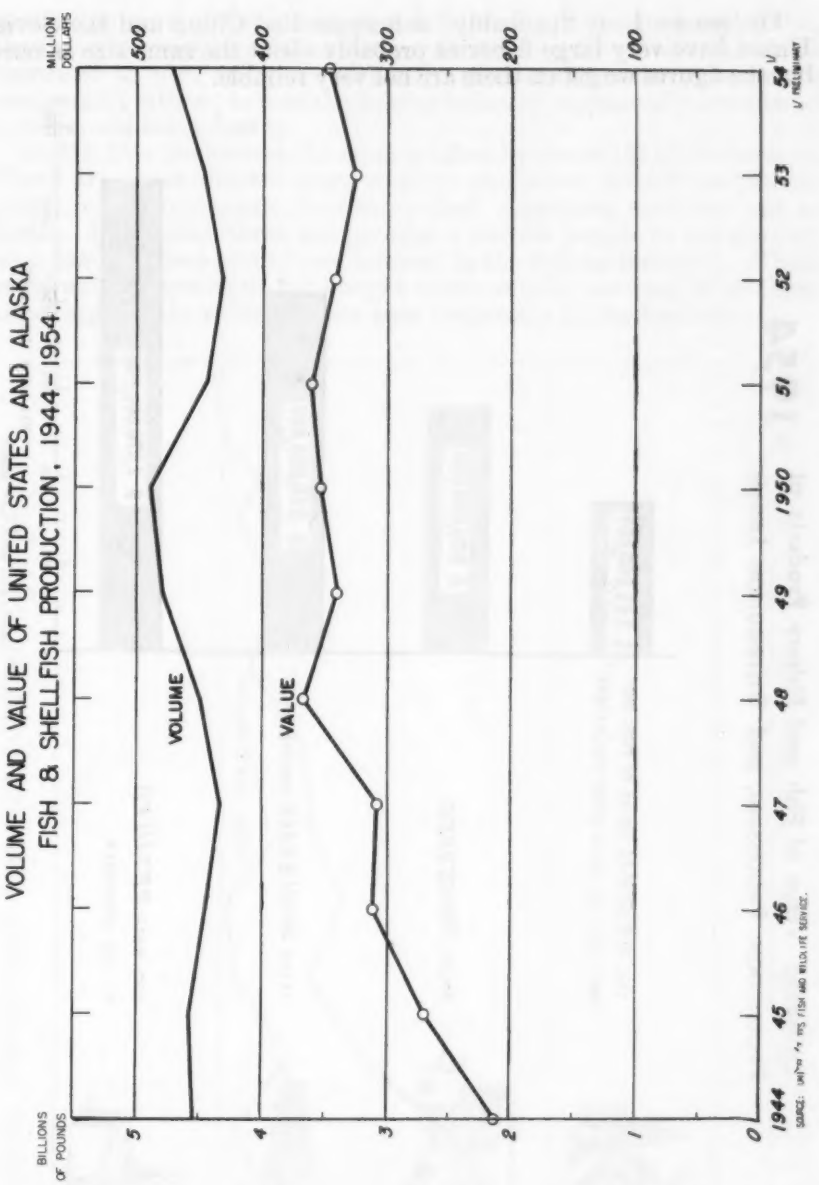
The CHAIRMAN. Will you give your full name and background?

STATEMENT OF ANDREW W. ANDERSON, CHIEF, BRANCH OF COMMERCIAL FISHERIES, FISH AND WILDLIFE SERVICE

Mr. ANDERSON. My name is Andrew W. Anderson. I am Chief of the Branch of Commercial Fisheries. I was graduated from the school of fisheries at the University of Washington in Seattle. The first 8 years after that I spent working in the commercial fishing industry in this country and abroad. After that I began work with the old Bureau of Fisheries in 1930 and have continued with the Bureau of Fisheries and the Fish and Wildlife Service since.

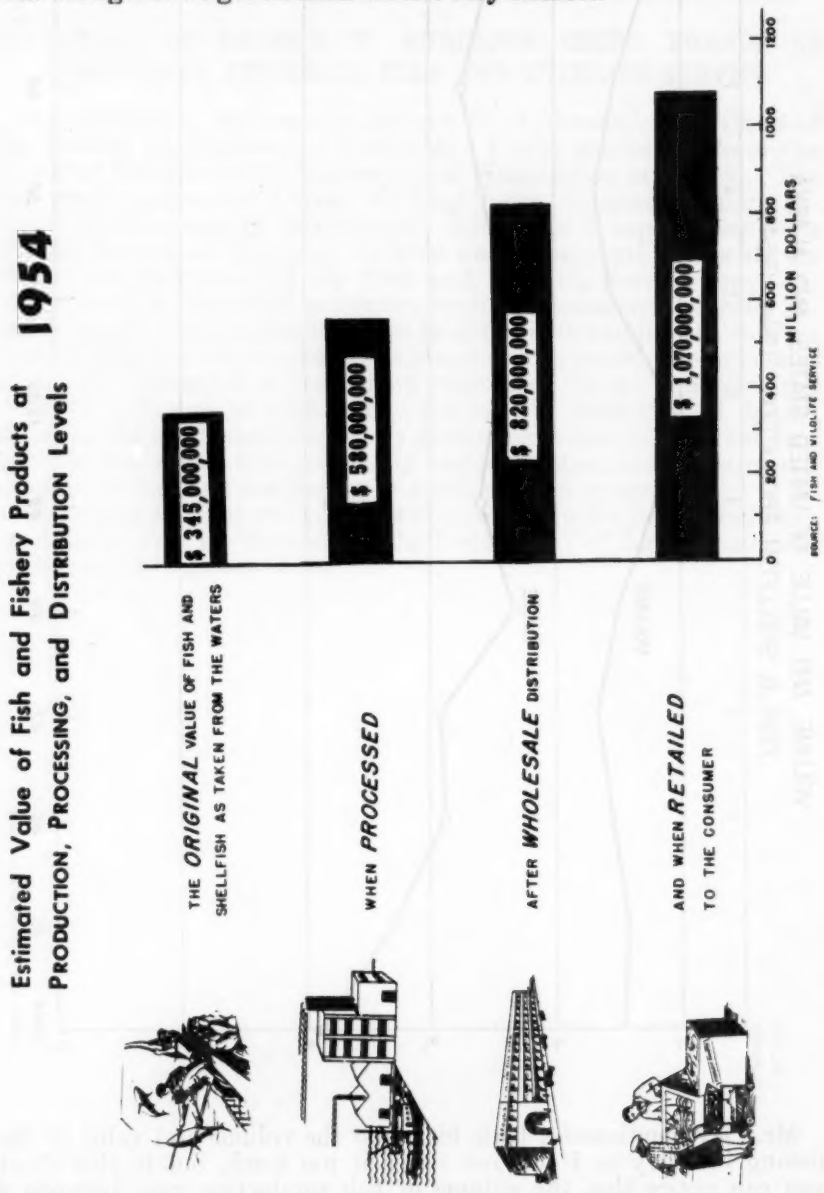
Our work is concerned primarily with the commercial fishing industry itself. Our responsibility is to aid in maintaining the welfare of the fishing industry by conducting exploratory work, developmental work, and utilization of the fishery resources. To do that we carry out such activities as exploratory fishing, the collection of fishery statistics, the conduct of the fishery market news service. We conduct technological research in processing and production and we carry out economic studies and marketing and distribution programs.

You might say that we are called upon to do for the fishing industry practically all of the things that the Department of Agriculture does for farmers in this same field.



Mr. Day mentioned a little bit about the volume and value of the fishing industry so I will not stress it too much, but in this chart you can notice that the volume of fish production runs between 4 billion and 5 billion pounds a year. It varies according to the species that are caught. Sometimes one species is up and sometimes another, but in general it runs about 4 billion to 5 billion pounds. This represents 10 percent of the world catch of fisheries and makes us probably the second fishing nation in the world after Japan.

The reason I say "probably" is because Red China and the Soviet Union have very large fisheries probably about the same size as ours, but the figures we get on them are not very reliable.



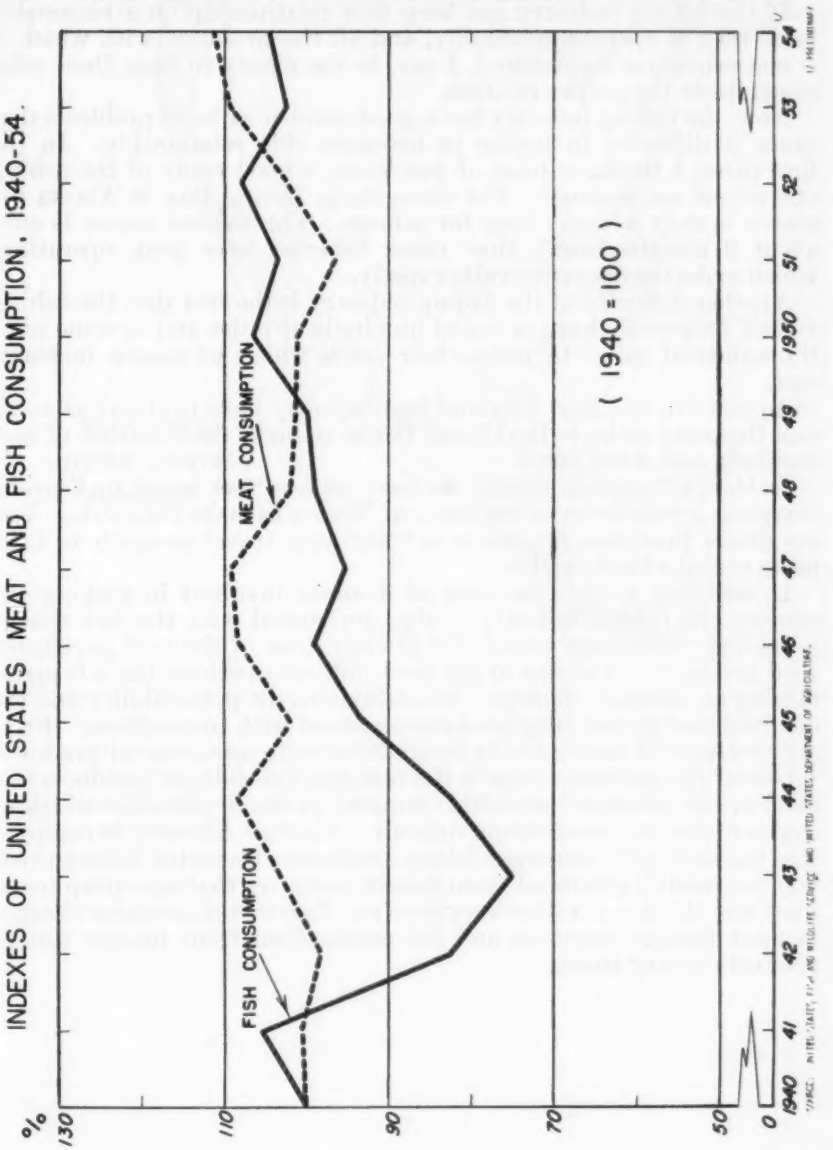
The value of the fisheries since about 1948 have been up around $350 million, which is quite a substantial value for a fishing industry.

Mr. TOLLEFSON. When you say value at $350 million, at what point is that?

Mr. ANDERSON. At the fishermen's level. The fishermen in 1954 were paid $345 million, which is practically $1 million a day for the fish they caught. As it moved through the channels of trade into the

processing part of the industry, the canners and freezers, and so on, the value increased to $580 million. As it got to the wholesale level it increased to $820 million, and finally when retailed to consumers it was over $1 billion; so that the fishing industry is generally considered a billion-dollar industry.

As Mr. Day mentioned the catch is taken by about 160,000 fishermen. There are about 100,000 shore workers and about 300,000 people engaged in making boats, furnishing fuel, supplying services, and so forth. In general, there are perhaps 2 million people in the country who have a direct or indirect interest in the fishing industry. There are about 200 species of fish caught commercially but only 20 of them are of significant value and are seen frequently in the markets.



Probably all of the commercial fishing industry's problems are tied right up in this chart. As you will see the solid black line represents an index of fish consumption. The dotted line is meat consumption. What the fishing industry strives to do is maintain a normal relationship between fish consumption and meat consumption.

During the World War II period, of course, fish consumption was quite low because a large part of the canned fish production was taken by set aside orders and shipped to our allies to help feed them; but after the war fish consumption came more or less back to normal. This period represents when fish consumption increased here because meat prices were very high. As meat prices have become more reasonable, fish prices have dropped somewhat but are still doing quite well.

If the fishing industry can keep that relationship on a reasonable basis then it operates profitably, and all the problems with which it is concerned are represented, I say, in the efforts to keep these relationships in the proper relation.

Now, the fishing industry has a good number of basic problems that cause it difficulty in trying to maintain this relationship. In the first place, I think, as most of you know, a good many of the fishing operations are seasonal. For example, in Bristol Bay in Alaska the season is only 3 weeks long for salmon. The halibut season is only about 2 months long. Most other fisheries have peak operations which make the operation rather costly.

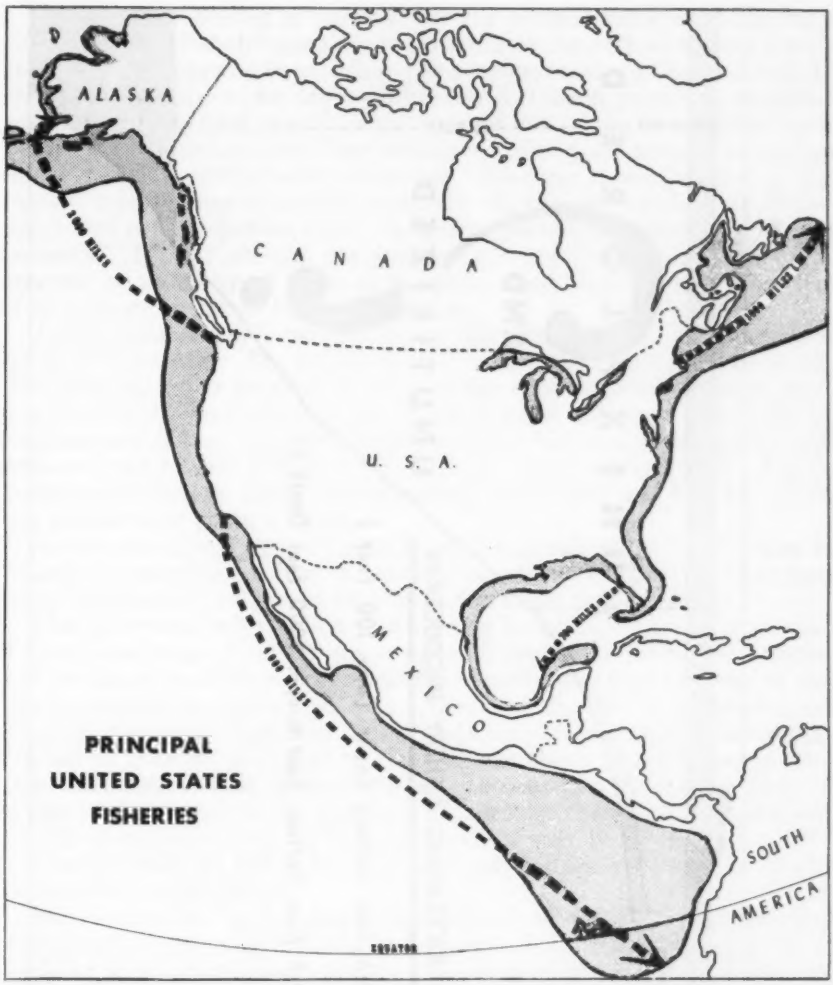
Another difficulty of the fishing industry is the fact that the fishing vessels frequently have to travel hundreds of miles and in some cases thousands of miles to make their catch which of course increases cost.

As you can see, New England trawlers may have to travel as much as a thousand miles to the Grand Banks to make their catches of cod, haddock, and ocean perch.

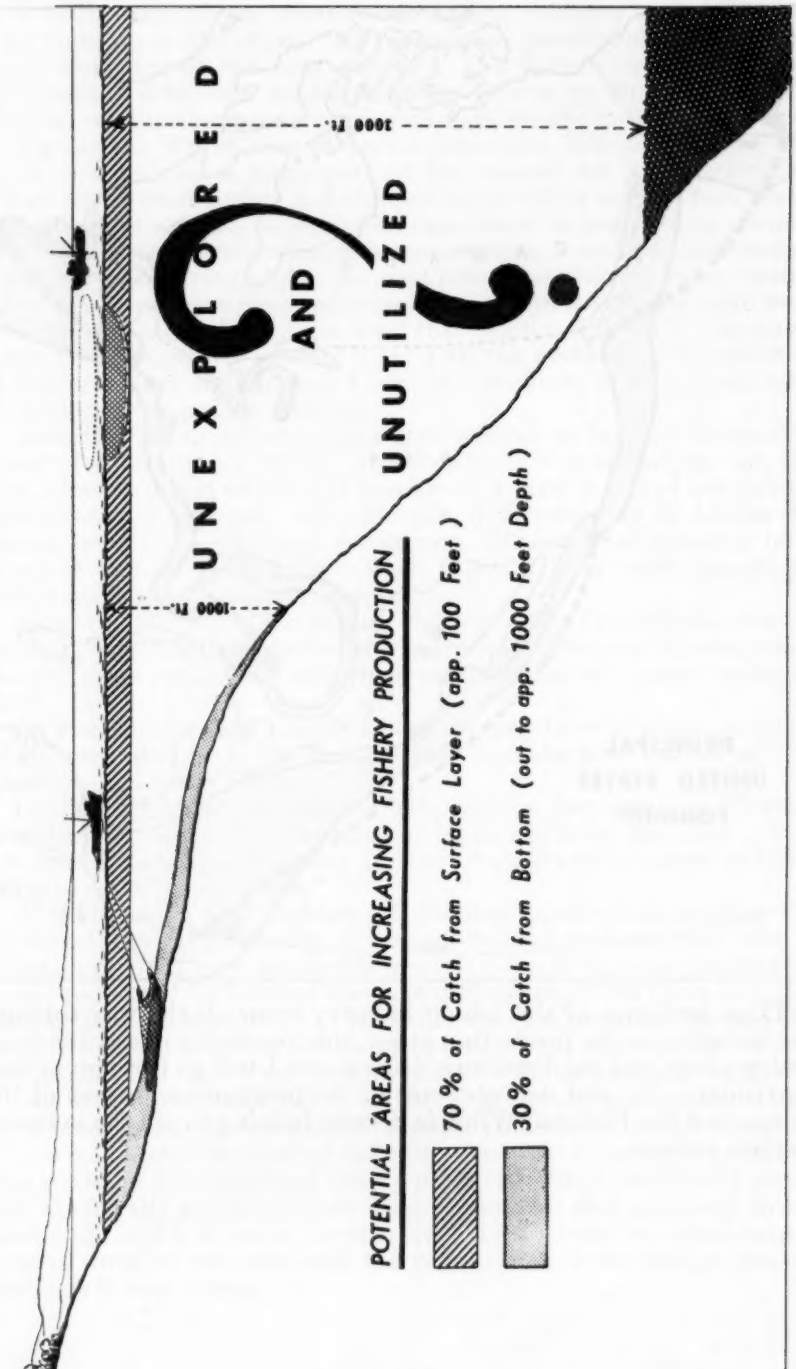
In the gulf shrimp fishery we have quite a fleet based in Florida, traveling 700 miles to off the coast of Mexico to make the catch. You are aware that tuna fishermen in California travel as much as 4,000 miles to make their catches.

In addition to this problem of distance involved in making the catches, the fishing industry is also confronted with the fact that it is dealing with a very perishable product—one of the most perishable food products. And one of the most difficult problems there is maintaining an adequate quality. In addition to the perishability and the distance they travel, they are also concerned with competition. Fishery products of course are in competition with agricultural products.

One of the problems there is the fact that agricultural products in a good many instances have either support prices or subsidies which of course makes the competition difficult. Another difficulty in competition has to do with imported fishery products. Imported fishery products are usually produced from fishery resources that are cheap to exploit and the fish is rather inexpensive. Labor costs are also cheaper in most foreign countries and the competition from foreign fishery products is very strong.



These problems of the fishing industry occur all the way through the industry, in the production phase, the processing phase, the marketing phase, and the distribution phase, and I will go through in that particular order and indicate some of the programs and some of the things that the Fish and Wildlife Service is doing to aid the industry in these respects.


UNEXPLORED AND UNUTILIZED
1000 Ft.
1000 Ft.
POTENTIAL AREAS FOR INCREASING FISHERY PRODUCTION
70 % of Catch from Surface Layer (app. 100 Feet)
30 % of Catch from Bottom (out to app. 1000 Feet Depth)

Exploratory fishing is carried out for several reasons. The very first reason is that this country is growing at the rate of almost 3 million people a year and to maintain the average consumption and supply the fishery products for these additional 3 million people means that well over 100 million pounds additional of fish has to be supplied each year. It is necessary therefore to either exploit your present resources more strongly or find new resources. Another reason we carry out exploratory fishing is to find resources that might be cheaper to develop and cut production costs. A third reason is tied in with national security. If war should develop we want to have our fishery resources, or as many of them as possible, close to the country so that they will not be cut off by enemy action.

At this time about 70 percent of our fish catch is taken in the surface levels of the water. We take it with live bait and seines, and so forth. The remaining 30 percent is taken with otter trawls, perhaps to a depth of 1,000 feet or possibly 200 fathoms. Most of our work in exploratory fishing is being conducted in this area from about 200 fathoms out to 500 fathoms. This is an area in which few, if any, commercial fishery floats are operating and there are fish but there are problems in getting them.

Sometimes a new type of gear has to be developed. The bottom is usually quite rough. It is an expensive operation, but we have had some satisfactory results in finding fish in these deeper waters.

The other area which we are exploring is this midwater depth. As I mentioned most of our fish are caught on the surface or on the bottom, but we know that there are fish in these midwater depths, both in the shallower and deeper water. As a result of that, we are carrying on experiments with what they call a midwater trawl. It is a device invented in Europe and used to some extent there and with some success. We believe that it can be used with considerable success here, if it can be developed in the proper way, because there are these schools of fish in midwaters which there is no other way to catch.

The CHAIRMAN. What kind of new catches are you making in the deep-water explorations?

Mr. ANDERSON. In the deep water we are catching usually the same varieties that are caught in shallow water. You will catch cod, or haddock, or sole. Particularly on the west coast of the Pacific Northwest, we developed new grounds in deeper water with the same varieties of fish.

Mr. TOLLEFSON. May I ask a question, Mr. Chairman?

The CHAIRMAN. Yes.

Mr. TOLLEFSON. You said something about catching fish in the intermediate depths. Do the foreign countries have departments such as yours?

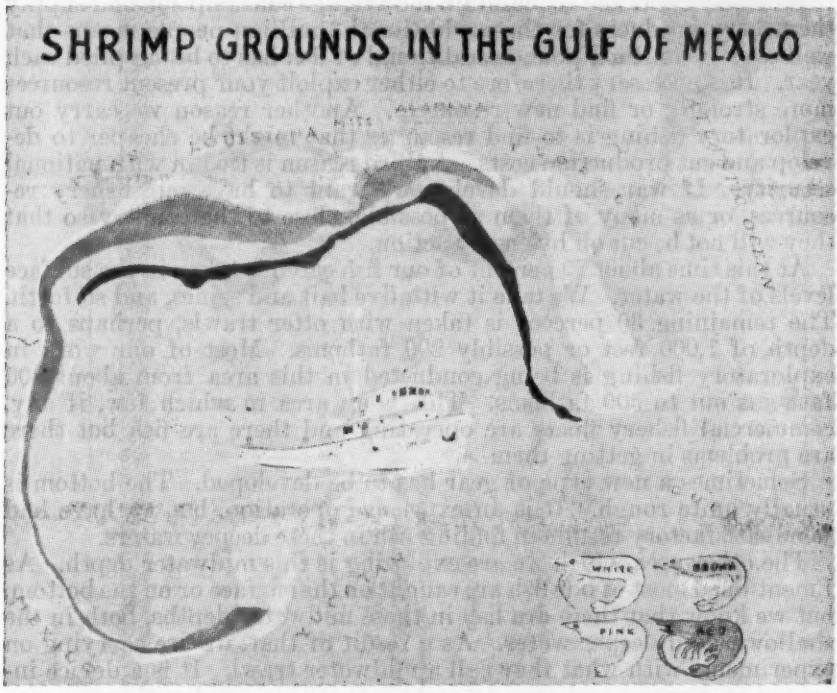
Mr. ANDERSON. Yes; all the major fishing nations do.

Mr. TOLLEFSON. Do they do quite a good deal of exploratory and research work?

Mr. ANDERSON. The major nations do a good deal more than we do—Norway, United Kingdom, and Japan—all of the nations which are major nations have very substantial fishery departments and do a lot of research work.

Mr. TOLLEFSON. Did I understand you to say that they do more than we do?

Mr. ANDERSON. If you want to take it on a volume basis or by coastline or almost any other way, they do more than we do.



This is an example of some of our exploratory fishing work in the Gulf of Mexico, particularly in regard to shrimp. The original shrimp fishery started with white shrimp, developed close to shore. Later they got to deeper water and caught the brown shrimp. About the same time, they also found pink shrimp. And those are the three varieties produced primarily now, but the shrimp fishery has—I would not say suffered—but it has a very large number of vessels in the fishing operation which are getting to the point where they are not nearly as profitable as heretofore.

We carried out with the vessel *Oregon* in the deeper waters of the gulf a complete survey of what might be found there with regard to shrimp. We found that in this particular area in 200 fathoms there is a substantial resource of what we call red shrimp which is red when it comes from the water and, strange to say, it has a taste that is very much like lobster, sort of a creamy taste.

There are substantial resources of shrimp there that sort of represent money in the bank for the fishing industry. There is no commercial operation on this particular resource yet for several reasons, primarily because it requires heavier gear and heavier winches and longer cables and things of that sort.

As the pressure on these other resources gets heavier there is not much question but what the shrimp industry will move to this particular resource and you will see red shrimp on the market.

Mr. TUMULTY. Mr. Chairman, may I ask a question?

The CHAIRMAN. Yes.

Mr. TUMULTY. When this research is done, which you describe both as to the shrimp and the deep-water fishing, the Government, I take it, does the research. Then what do you do? Recommend to private industry to explore?

Mr. ANDERSON. That is right.

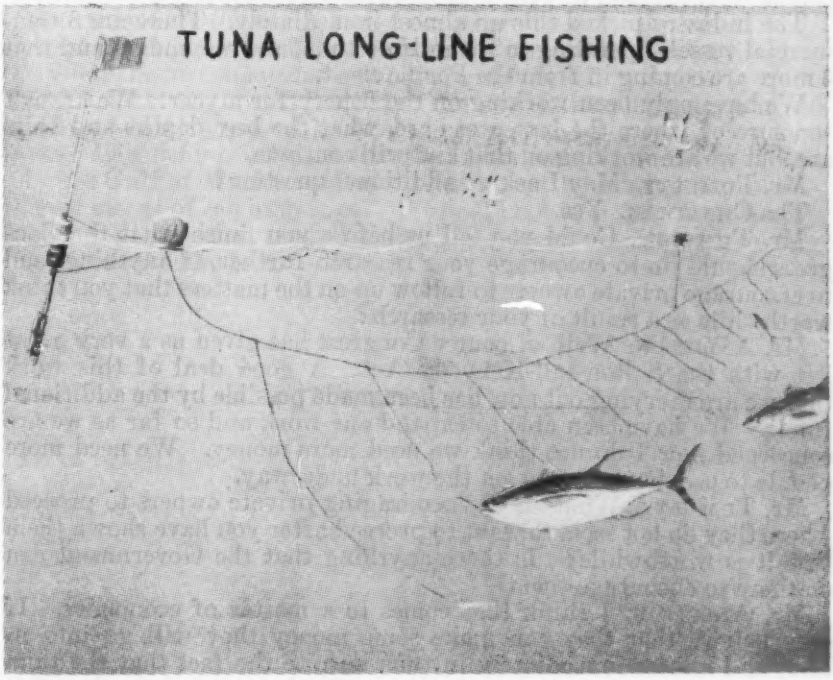
Mr. TUMULTY. Specifically, what do you do with respect to private industry?

Mr. ANDERSON. Well, we do several things. In the first place, private industry frequently goes out on our exploratory vessels. The fish captains and fishermen will accompany the vessel *Oregon* and find out what type of gear we are using, where we are fishing, and so on. Of course, full and detailed reports of all of these cruises are prepared and distributed to the industry.

Mr. TUMULTY. In the case of the red shrimp, what results do you have? Do these companies follow through on your suggestions?

Mr. ANDERSON. Not in the case of the red shrimp, because it is in deep water and will require separate financing and a lack of the regular shrimp before they go into that.

Mr. TUMULTY. In other words, they go forward and follow your suggestions where there is a case of their getting a return on their money?



Mr. ANDERSON. Yes; in that particular chart on longlining for tuna they have already followed through.

Mr. TUMULTY. What happens, Mr. Anderson, when you find something that should be exploited and that is not exploited by private industry? What happens then?

Mr. ANDERSON. You can only go so far in a case like that. You can bring it to their attention, and usually you have to wait for some sort of economic change to put it into effect.

Mr. TUMULTY. The Government does not proceed with it itself?

Mr. ANDERSON. No; we never do that. We will follow through to this extent: In the case of the red shrimp, we caught enough of the red shrimp and moved a few into the areas of trade to see what the buyers thought of them. They thought they would be a good specialty item for restaurants and hotels.

Mr. TUMULTY. Thank you very much.

Mr. ANDERSON. At the same time we were conducting our shrimp work in the gulf we saw a certain amount of tuna there and felt rather confident that there was a tuna resource that could be developed. We did not see a great many and tried to catch them with seines and gill nets and bait fishing, but had no luck whatsoever.

During the last year we found from indications on the depth finders that there were fish at depths which did not appear on the surface. We used a Japanese long-line set at a depth of about 20 fathoms or more, baited with squid or herring, or something of that sort. For the last 9 months of the year we have caught yellow-finned tuna in the Gulf. There does not seem to be much question but what there is a commercial resource of yellow-finned tuna in the Gulf.

The industry picked this up almost immediately. There are 3 commercial vessels operating in the gulf on tuna, and we understand that 3 more are coming in from the Pacific coast.

We have only been working on the fishery for a year. We are not too sure of where the best areas are, what the best depths and baits are, but we are working on that and will continue.

Mr. TUMULTY. May I ask an additional question?

The CHAIRMAN. Yes.

Mr. TUMULTY. Could you tell us before you finish what the Congress should do to encourage your research further, if anything, and to encourage private owners to follow up on the matters that you think worthwhile as a result of your research?

Mr. ANDERSON. Well, of course Congress has given us a very great lift with the Saltonstall-Kennedy Act. A good deal of this work that we are carrying out now has been made possible by the additional funds. We have been able to expand our work and so far as we are concerned now I do not think we need more money. We need more people to use the money to get the work underway.

Mr. TUMULTY. What about encouraging private owners to proceed where they do not seem to want to proceed after you have shown them that it is worthwhile? Is there anything that the Government can do there to encourage them?

Mr. ANDERSON. I think that comes to a matter of economics. If they believe that they can make some money they will go into it. They did almost immediately in tuna despite the fact that the tuna market is not in very good shape now. On the red shrimp, they feel that they can continue on the white and brown and pink and catch enough there to make their regular profit, but there is no question in our minds that it will not be too long before they will get into the red shrimp.

Mr. ALLEN. Mr. Chairman?

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. May I ask a couple of questions about long-line fish? Have there been developments by which the long lines are handled mechanically? As I remember the Japanese handled them completely by hand.

Mr. ANDERSON. Yes, the operation based in Hawaii is doing a lot of work on the mechanization of those long lines and they developed it to quite a point. In fact, there was an article in the recent Pacific Fisherman which indicated that an American vessel with a small crew of I believe 7 to 9 men could handle these Japanese long lines on a mechanical basis and do it commercially.

Mr. ALLEN. Do they bait those lines in the Pacific?

Mr. ANDERSON. Yes.

Mr. ALLEN. What do they use for bait out there?

Mr. ANDERSON. I believe they use squid and herring and use other local bait fish.

Mr. ALLEN. Are the tuna that they take the same type that are taken with live bait as to size and quality?

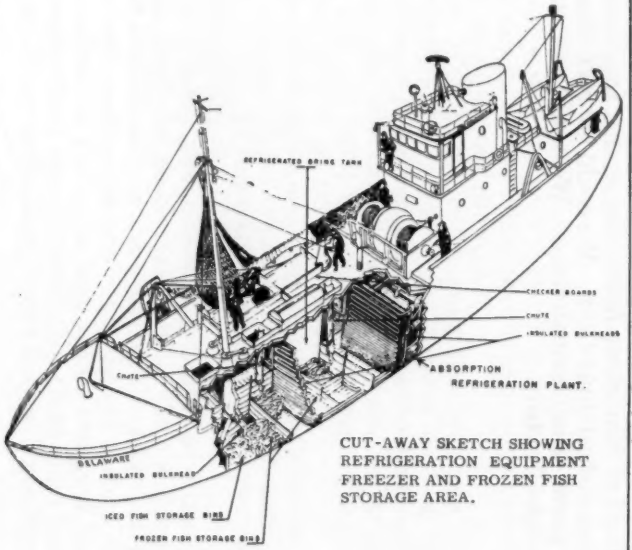
Mr. ANDERSON. Some of them are larger and they have had a little difficulty because of that. The cannery at Honolulu has rejected a fair amount from some of the catches that were made and also when the fish were brought to southern California they rejected a certain amount because of size and color.

Mr. ALLEN. Is there any indication that the development of long-line fishing is going to make unnecessary the production of live bait and all of the investigations going on in that field?

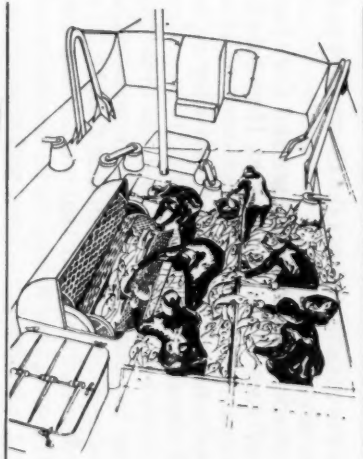
Mr. ANDERSON. I would say that that would be a long time in the future. I think the long-line fishing is particularly suited for some areas. Bait fishing is better for others, and seining for some others.

In the Gulf of Mexico we feel confident that longlining is probably the best means of catching tuna. We could not stop them long enough to put a purse seine around them. We could not stop them long enough to take live bait.

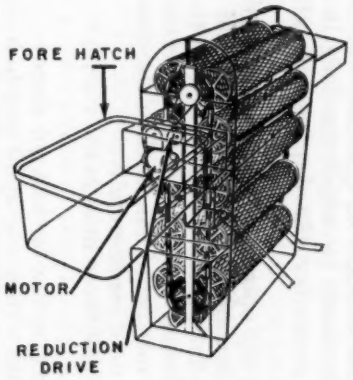
FISH AND WILDLIFE SERVICE — EXPERIMENTAL VESSEL, DELAWARE



CUT-AWAY SKETCH SHOWING REFRIGERATION EQUIPMENT FREEZER AND FROZEN FISH STORAGE AREA.



DECK VIEW OF FISH SORTING AND CHARGING TO CONTAINERS FOR FREEZING.



PERFORATED CONTAINERS FOR BRINE IMMERSION FREEZING OF FISH ABOARD SHIP.

A part of the production field that I mentioned is the maintenance of quality in fish. The domestic industry is up against a problem there because for most of its fishing it has to go quite a distance. Foreign countries, particularly Norway and Iceland can go out fishing in the morning and bring their fish back at night and process them immediately and maintain top quality. In Newfoundland it is very much the same. As I showed in an earlier chart, most of our fishing has to be done at considerable distance and fish are brought back in ice and it is difficult to maintain quality.

We have felt that the only way that the industry can compete over a long period and maintain top quality is to freeze the fish when they are caught at sea. We have a full-sized New England trawler based in Boston which has been equipped with brine freezing apparatus for freezing the fish at sea.

For the last 3 years, I believe it is, we have been working out all the bugs, you might call them, in this process. We are about at the point where we think we can recommend to the industry that it can produce top-quality fish to advantage by freezing the fish at sea. This particular process has a number of advantages. In the first place, the fish, as they are caught, are put in these baskets in this freezing equipment to go into the brine. They are frozen in a relatively short time, an hour or 2 hours, and then placed in the hold of the vessel.

The fish are frozen round so that the fisherman does no dressing of fish on board. Another advantage is that the vessel can stay out until its hold is full and it returns to the landing port with a full production of fish which reduces cost. Another advantage that the fishermen are very keen about is that when the fish are brought in, every fish is top quality. There is no difference in the load of fish. Although they were caught at different times, they were all frozen immediately and there is no opportunity for sell-overs and disputes between the fishermen and dealers as to quality.

From the point of view of the shore processor there are considerable advantages. It is usual that when the filleting crew reports in Boston on Monday that it must be paid for a full week's work. Unfortunately, the landings of fish are not regular. Weather enters in, and you may have a lot one day and no fish another day. When the fish are frozen at sea and brought in to shore, it is a simple matter for the manufacturer to withdraw enough fish from storage to keep his help occupied, and we are informed that this will mean a substantial saving to the processor.

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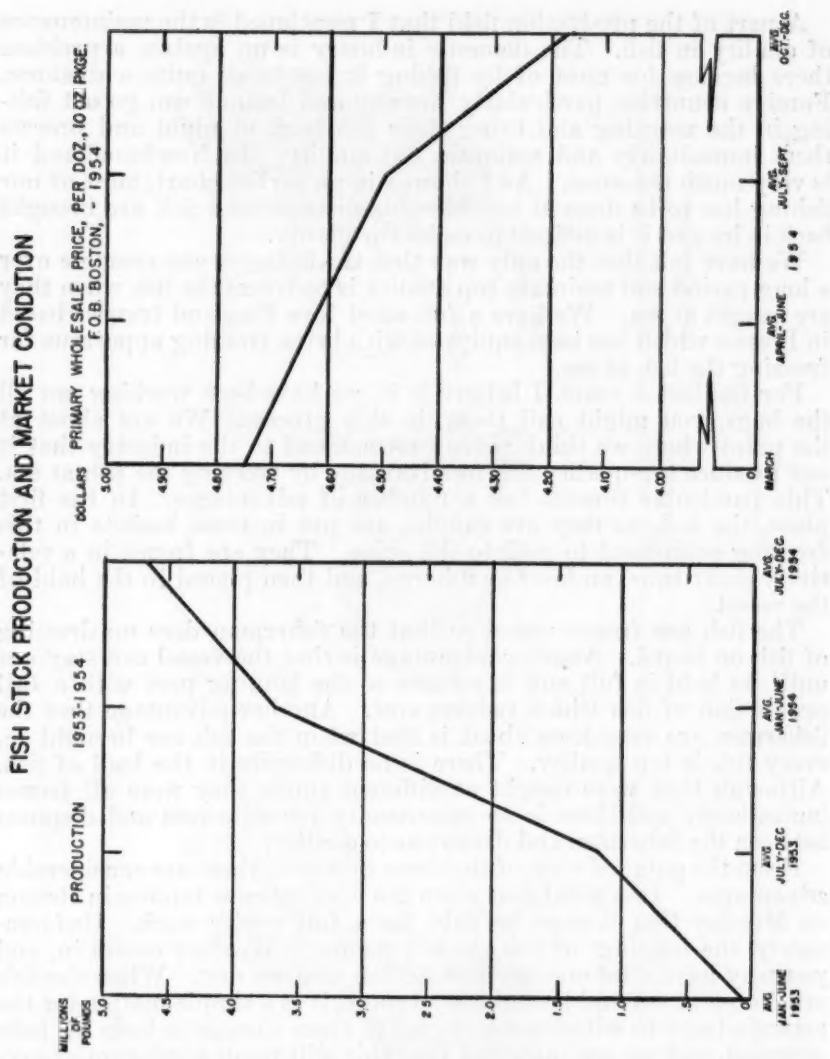


Another problem in the processing field has to do with the development of standards for fishery products. The fishing industry has no standards for its fresh and frozen products such as agriculture has for practically all of the agriculture products. This has caused certain difficulties in the industry, and I think this chart illustrates it.

About 2 years ago, a new product was developed in the industry called fish sticks. It really looks like an overgrown french-fried potato, you might say, which has been precooked and is covered with breading. It is retailed in 8- to 10-ounce packages with about 10 sticks to a package. It has taken hold very well, because all the housewives have to do is take the fish sticks, put them in the oven and warm them and they are ready to serve.

As you can see in the chart on production, the production has gone up tremendously. It was only 7 million pounds in 1953 and went to over 50 million pounds in 1954. At the same time the price started rather high up here. As production increased, it went on down rather sharply.

What has happened now is that it as at a level where the profit margin is very small and the processors are looking to ways to cut corners in production. Fortunately, the major fish stick producers were very much afraid that if nothing was done about maintaining quality that there would be some people in the industry who would put poor quality fish into fish sticks and spoil the market for everyone.

As the result of that, they got together with us and worked out standards for fishery products, and at a recent meeting of the National Fisheries Industry, the fish sticks committee formally asked the Fish and Wildlife Service to develop voluntary standards for fish sticks, to have them promulgated and to provide an inspection and certification service.

We have this work underway now. And later on this year we hope to be able to have developed and promulgated the first voluntary Federal Government standards for frozen fishing products. There is nothing obligatory about them. The industry can use them or not, as they want.

The experience has been in agriculture that when you make these standards available the buyers are so interested in having a set of standards and grades that they can look to, that there is not much trouble about putting them into effect.

Chain stores, for example, use them extensively for frozen agricultural products now and have told us that they would like to do the same thing with fish. We do not think there will be much trouble about the standards being utilized once they are developed.

So far as the certification and inspection is concerned, the Government provides that service, but it is paid for by the industry so there is no cost to the Government. It is a very encouraging thing to have the industry request standards because we think that it is the one important thing in the processing and marketing part of the industry that will do more to help the industry than anything else.

Mrs. SULLIVAN. May I ask one question of Mr. Anderson?

The CHAIRMAN. Mrs. Sullivan.

Mrs. SULLIVAN. As the catch comes in frozen and it is sold or goes wherever the frozen fish go, before those things are processed are they defrosted or thawed out?

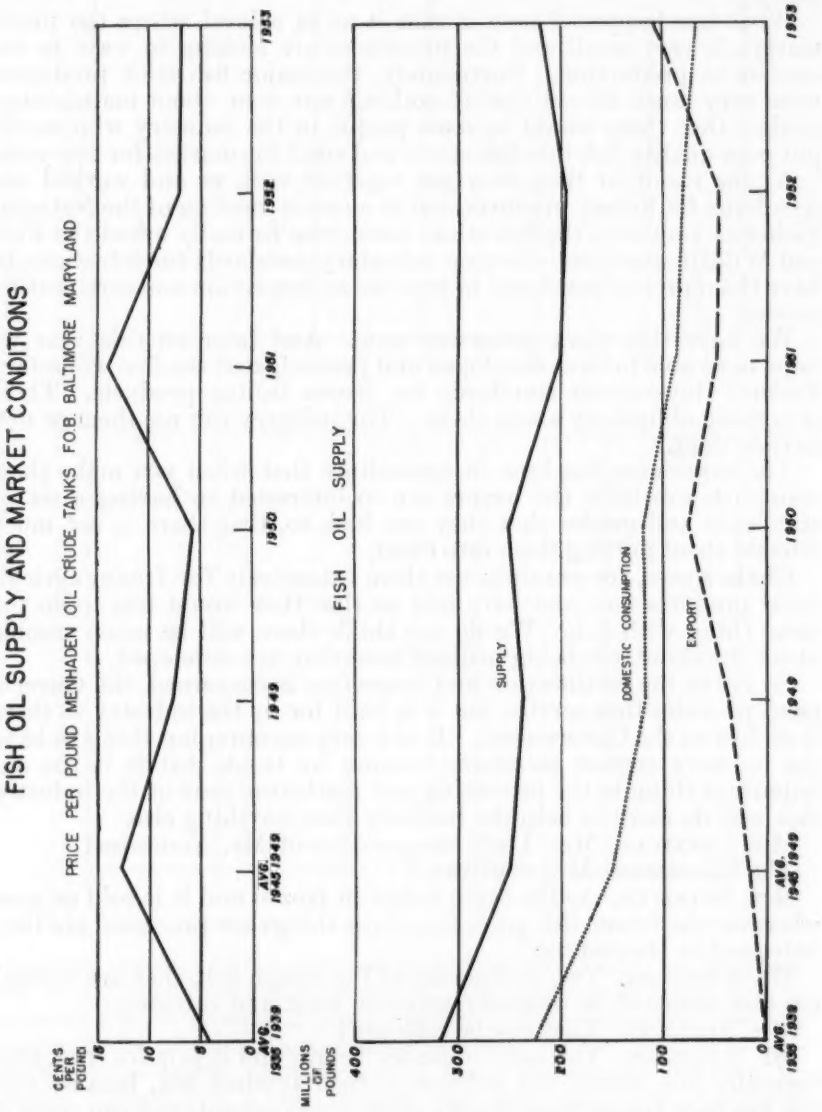
Mr. ANDERSON. Yes; in the case of the frozen fish, they are thawed out and prepared in whatever way you want and refrozen.

Mrs. SULLIVAN. They can be refrozen?

Mr. ANDERSON. You have probably heard, and it is quite true, that normally you should not refreeze a food product but, because this fish has been frozen immediately after it was caught, you can thaw it out and refreeze it with practically no change in it.

Mrs. SULLIVAN. That is what was worrying me. Thank you.

Mr. ANDERSON. In regard to standards, I might say also that it has been quite encouraging that the shrimp industry and the crabmeat industry are also very much interested in developing standards for their products.



Another problem that we get into that is away from the food field and industrial products has to do with the fish-oil supply. As you see in the top graph the price of fish oil, which happens to be menhaden oil, has varied considerably in the past several years. It started below 4 cents and went to almost 15 cents and leveled off now at 6 cents.

The unfortunate thing is that although the supply of fish oil has gone up somewhat, domestic consumption has gone down considerably over a period of years. That is due primarily to the fact that detergents have been produced and are so widely used. Formerly, a large part of the fish oil went to soap manufacturing and there was a market which is there no longer, and it has caused the industry trouble.

However, the industry has been fortunate in developing an export market. In the last several years Germany particularly has taken a large amount of fish oil to make into margarin. However, this market is not going to last because there is too much competition in the fish-oil business. This happens to be one of the particular areas where Saltonstall funds are coming to our aid. What we are doing here is conducting basic research on fish oil itself to determine its composition, the components in it, and we feel rather confident that there are things in fish oil that can be put to better use than margarin or soap or things like that.

We think that in the matter of a year, or so, we should be able to come up with some basic information that we could take to the chemical industry, for example, or the pharmaceutical industry, and interest them in certain components of fish oils and perhaps get a higher price for them.

This work is being conducted partly in our own technological laboratories and also by contract with State universities, private organizations, such as Hormel Institute and the Armour Foundation, which are experts in this particular field.

The CHAIRMAN. Is the take of the menhaden increasing or decreasing?

Mr. ANDERSON. The take of menhaden has been increasing practically every year for about the last 10 years.

The CHAIRMAN. It is increasing?

Mr. ANDERSON. That is right.

The CHAIRMAN. Is it increasing further offshore as to the habitat of the fish?

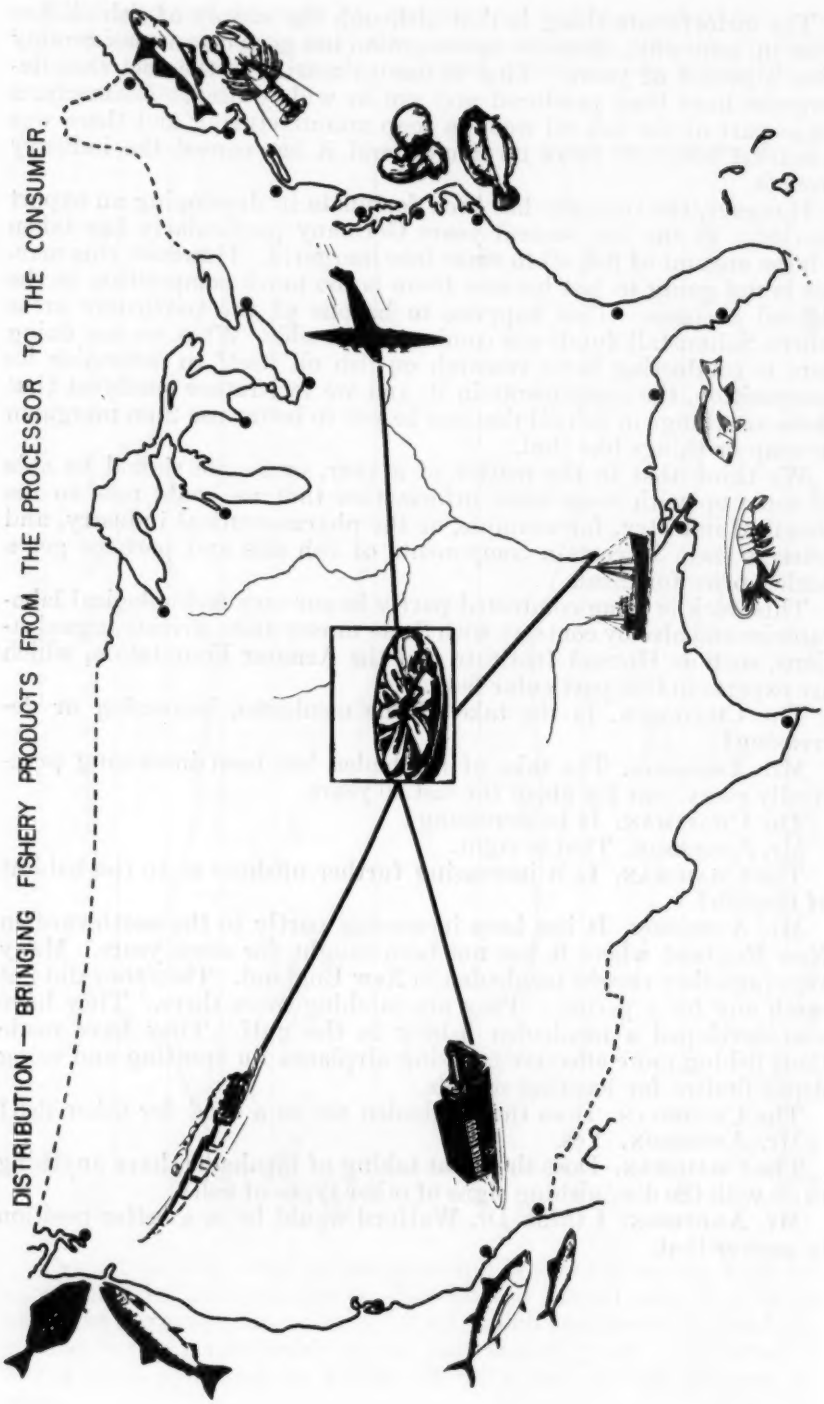
Mr. ANDERSON. It has been increasing partly to the northward in New England where it has not been caught for some years. Many years ago they caught menhaden in New England. Then they did not catch any for a period. They are catching more there. They have also developed a menhaden fishery in the gulf. They have made their fishing more effective by using airplanes for spotting and using depth finders for locating schools.

The CHAIRMAN. Does the menhaden act as a food for other fish?

Mr. ANDERSON. Yes.

The CHAIRMAN. Does the great taking of menhaden have anything to do with the diminishing signs of other types of fish?

Mr. ANDERSON. I think Dr. Walford would be in a better position to answer that.

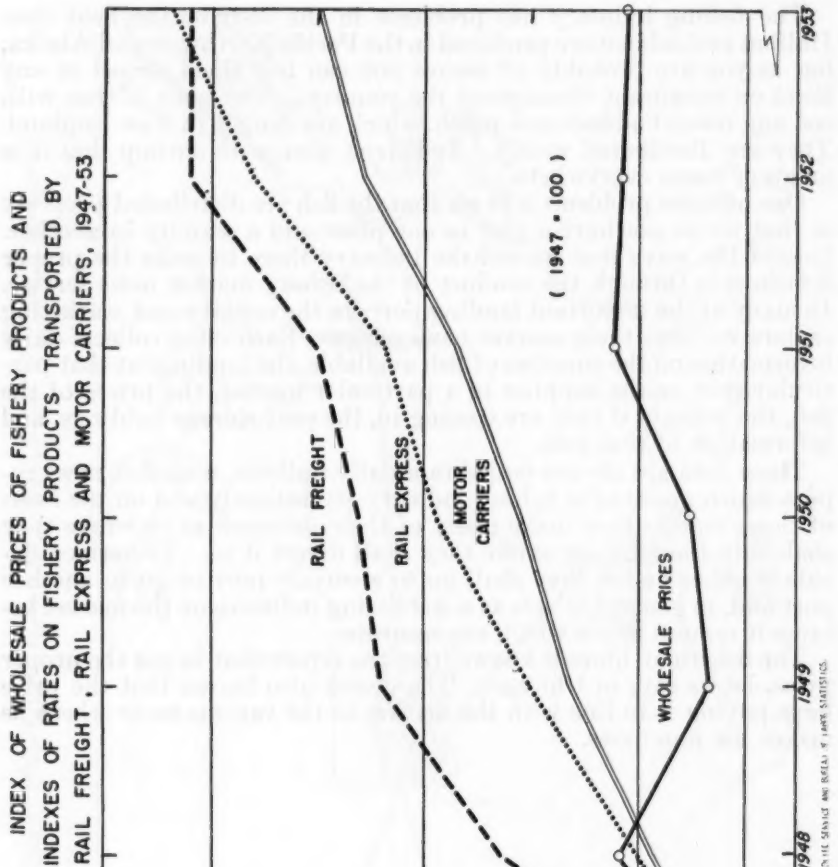

DISTRIBUTION — BRINGING FISHERY PRODUCTS FROM THE PROCESSOR TO THE CONSUMER.

The fishing industry has problems in the distribution field also. Halibut and salmon are produced in the Pacific Northwest and Alaska, but as you are probably all aware you can buy them almost at any hotel or restaurant throughout the country. The same is true with cod and ocean haddock and perch, which are caught in New England. They are distributed widely. It is true, also, with shrimp that it is on every menu everywhere.

One of those problems is to see that the fish are distributed properly so that we do not have a glut in one place and a scarcity in another. One of the ways that we aid the industry there to make the proper decisions is through the conduct of the fishery market news service. In many of the important landing ports in the country and marketing centers we have these market news offices. Each office collects daily information on the supplies of fish available, the landings at that particular port or the supplies in a particular market, the prices of the fish, the imports if they are coming in, the cold-storage holdings, and information of that sort.

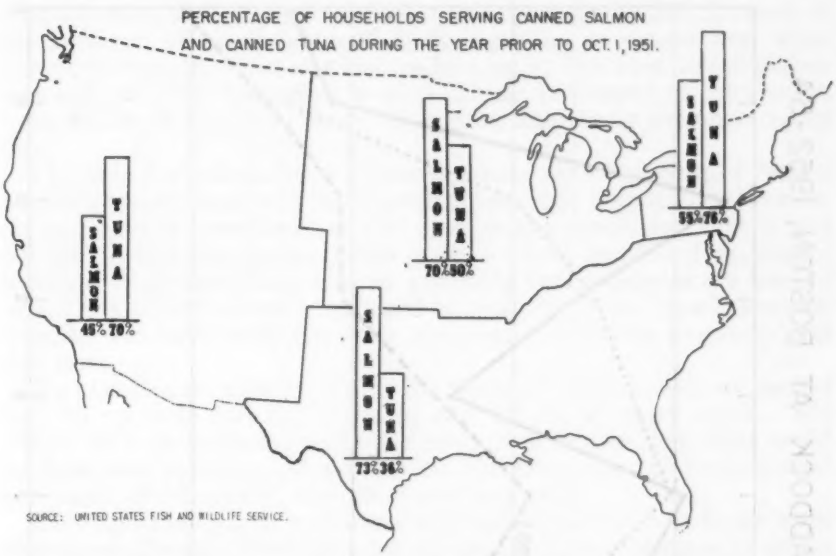
These data are always issued in a daily bulletin, a market news report which goes to the fishing industry immediately and on the basis of those reports they make many of their decisions as to where they shall ship their fish or where they shall divert it to. Fishermen decide whether or not they shall go to a certain port or go to another port and, in general, it acts as a stabilizing influence on the market because it reports prices which are accurate.

The fisherman himself knows from the report that he got the proper price, let us say, in Chicago. The dealer also knows that the price he is paying is in line with the market in the various areas where he makes his purchases.



In the transportation field because the distribution is so widespread, transportation costs are an important factor in the fishing industry. The thing that disturbs the industry most here is the fact that for the last 3 or 4 years wholesale prices of fish have remained approximately level, but as you can see from these other lines on the chart, rail freight cost, rail express cost, and truck costs have all gone up at a rather steep incline.

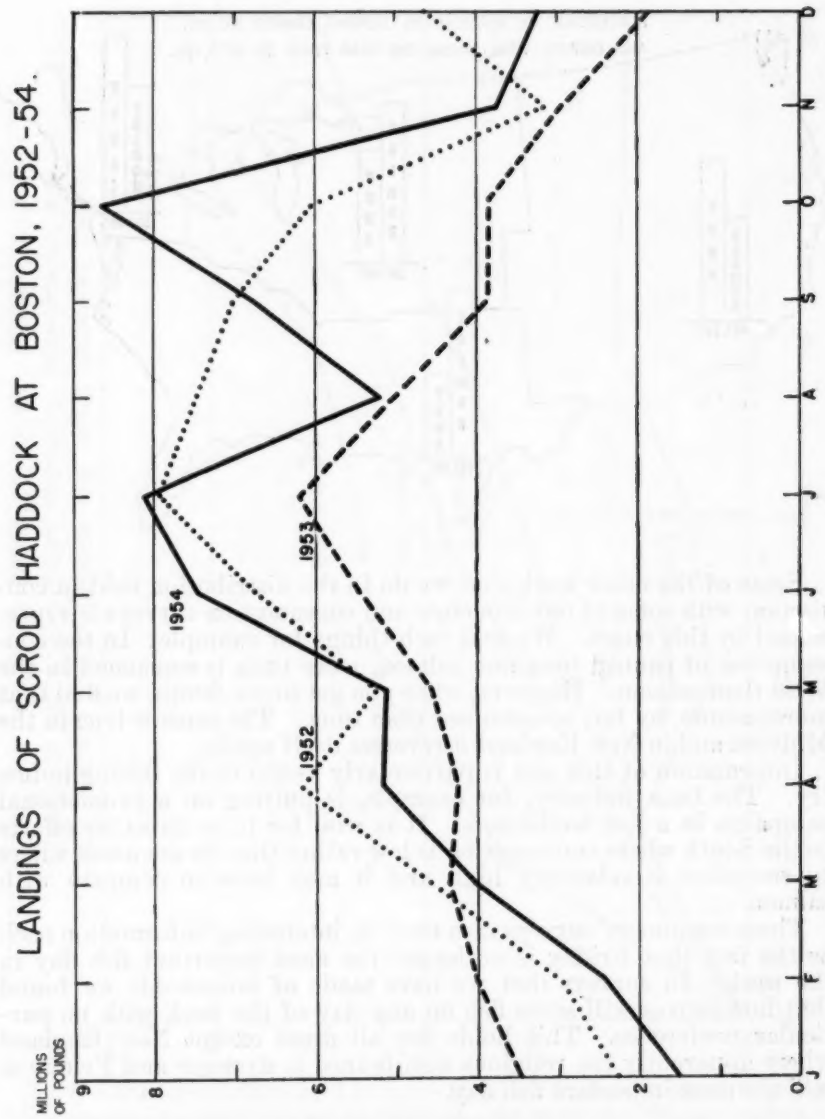
Our particular interest in this is to use all of our statistical data in appearances before the Interstate Commerce Commission. When rate increases come up we present the case for the fisheries to the extent that the rates that are increased and justified.



Some of the other work that we do in the distribution field in connection with some of our economic and consumption surveys is represented by this chart. We find such things for example: In the consumption of canned tuna and salmon, more tuna is consumed in the West than salmon. However, when you get to the South, we find that more salmon, by far, is consumed than tuna. The same is true in the Midwest and in New England it reverses itself again.

Information of this sort is particularly useful to the fishing industry. The tuna industry, for example, is putting on a promotional campaign in a few weeks now. It is wise for it to direct its efforts to the South where consumption is low rather than to the areas where consumption is relatively high and it may have to compete with salmon.

These consumers' surveys also turn up interesting information such as the fact that Friday is no longer the most important fish day in the week. In surveys that we have made of households we found that housewives will serve fish on any day of the week with no particular preference. This holds for all areas except New England where apparently the religious significance is stronger and Friday is still the most important fish day.



In the marketing field we ran into a very interesting problem last fall in New England and also the first month of this year. This chart represents the landings of scrod haddock or small haddock in Boston over the last few years. You can see landings generally reach a peak in the middle of the summer and then decline. The industry based its operations on that particular development. They will buy haddock here and when they cannot sell them, freeze them and keep them for later on.

In 1954, the black line on the chart, the supplies of small haddock were quite large and we reached a point where the price went so low

that many of the boats quit fishing. All through the fall, instead of the landings of small haddock declining, they increased, and what happened was that the warehouses became so full that the situation was serious. The boats had to stop fishing and many of the dealers were unable to buy fish because they were financially overinvested in fish.

The industry asked that we remove a substantial amount of frozen haddock by purchase with Saltonstall funds. We looked into this matter and gave it consideration and came to the conclusion that it was not the feasible way to handle the situation, first, because if we bought haddock in Boston there was no guaranty that whatever we bought would not be immediately replaced by imports from Canada because Canada was faced with the same situation. It had an oversupply at that time.

We also had no assurance that the fishing vessels would not go out and fill up with fish and come in and fill the storages again. We talked with the industry and convinced them finally that what could be done was to carry out a joint Government-industry promotional program. Fortunately, it worked out very well.

Although the industry was seriously strapped so far as funds were concerned, they did provide a lot of visual material for use in stores and things of that sort. For the Government's part, we went to the National Restaurant Association, which has 6,500 members. We went to the chainstore national organization and the independent grocers, and told them what the situation was and asked for assistance in promoting a haddock campaign.

All of them were very agreeable to doing this. They mentioned haddock in all of their leaflets, and so on.

We went to the Department of Agriculture and used their mailing list that goes to the 45,000 food editors and dietitians, and so on. We also carried out a haddock campaign in our school-lunch program.

This campaign has worked so well that at the particular moment we are closer to a shortage of haddock than to a surplus. The holdings of haddock dropped almost immediately when we started the campaign because of the fine support we got from the chainstores and restaurant association, and perhaps the best indication is that the price of haddock fillets went up 2 cents a pound. There is no problem there now and everyone is feeling fine.

Mr. Day suggested that perhaps you may want to take some time with some general questions now.

The CHAIRMAN. Mr. Robeson?

Mr. ROBESON. No questions.

The CHAIRMAN. Mr. Tollefson?

Mr. TOLLEFSON. No questions.

The CHAIRMAN. Mr. Allen?

Mr. ALLEN. Mr. Chairman, possibly Dr. Walford can tell us a little about the organization of the States and Great Lakes, if any. I am curious to know whether there is anything around the Great Lakes comparable to the organizations under the interstate compact that exists on the several coasts.

Dr. WALFORD. There is not; no, sir. However, there is a treaty that is coming before the Senate for ratification between the United States and Canada which would make this an international problem, but there is no interstate organization.

Mr. ALLEN. Under the treaty, will the Federal Government have a regulatory power over all of the lakes?

Dr. WALFORD. I presume so. No; there will be no regulatory power; it will be confined to research and the problem of controlling the sea lamprey.

Mr. ALLEN. Is there any connection between the lack of regulation and the whitefish fishery that came about because of an inability of the several States concerned to get together on a common regulation?

Dr. WALFORD. Yes; that is true.

Mr. ALLEN. Was that a good part of the trouble there?

Dr. WALFORD. It is a case where the Federal Government does not have jurisdiction and the States did not get together on the regulation. It is an interstate problem.

Mr. ALLEN. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Thompson?

Mr. THOMPSON. No questions.

Mr. PELLY. Mr. Chairman, I would like to ask one question.

I have not heard anything about the halibut since I came in. I understood that quite a good job had been done in restoring the resource of the halibut.

Dr. WALFORD. That is true. That was done under the auspices of the International Halibut Commission. The Fish and Wildlife is not connected with that organization. That is generally considered a classic example of the restoration of a depleted fishery by scientific direction of the fishery as a result of research. That is, the pattern or the design of regulation was based on a very intense, thorough program of biological research.

Mr. PELLY. Then, too, would you comment on what is being done about the king crab research?

Dr. WALFORD. Yes, sir. We have begun an investigation with the king crab. We started this about a year or two ago and are doing it in close collaboration with Japanese biologists.

Mr. PELLY. You might describe the king crab, because I am sure some of the members of the committee may not know the size of it.

Dr. WALFORD. The king crab is a spider crab. It does not look like the blue crab of the Atlantic coast. It is an animal with a small round body and enormous legs which extend 6 feet or more across. They are tubular-shaped legs and fine crabmeat is contained in those legs. It is the object of a fairly new American industry.

Japanese fishermen also fish for the king crab and are also engaged in a biological study with which our people collaborate. We have set up a fund from the Saltonstall-Kennedy fund for study of the king crab. Our problem has to do with the rate of growth of the crab, the duration between molts, the determination of the spawning grounds, the course of drift of the larvae, a study to determine what the enemies of the crab are and what the oceanographic conditions are that affect the survival of its young and, of course, what we have in mind, ultimately, is the determination of how best to direct the fisheries so as to get the maximum sustained yield out of this resource.

Mr. PELLY. Do these king crabs migrate?

Dr. WALFORD. Presumably so. They certainly migrate in their very young stages. They migrate passively with the current. This is one of the things we have to find out. We have to develop a method

of marking them in some way and that is complicated because they molt and in throwing off their shell they will throw off the tag too. This is a knotty problem in which we are now engaged: How can you mark one of these animals so as to trace the routes of their migration?

Mr. PELLY. This is a problem and if research is done on it now it may mean that we will protect and preserve a good resource before it becomes depleted by overharvesting.

Dr. WALFORD. That is the whole direction which our research is taking to arrive at a pattern of regulation of the fisheries so as to conserve the resource and get the most that it has to yield at the same time.

The CHAIRMAN. Are the Japanese crab canneries operating off the Pacific coast now as they did prior to World War II?

Dr. WALFORD. Yes; they can work on the Pacific coast.

The CHAIRMAN. Are they, I say?

Dr. WALFORD. They are, yes. There are floating factory ships.

The CHAIRMAN. What problem is that going to cause now with respect to our cannery products, in the taking of the crab and other fish, with respect to the labor laws, and the health laws and the health conditions under which they are canned, compared with our canning? What problems will that cause in the difference in expense due to those factors?

Dr. WALFORD. You mean perhaps their canning process is cheaper than ours, because their standards are lower.

Do you know, Mr. Anderson, about that? What about the standards of the Japanese?

Mr. ANDERSON. I think that was brought out in a recent tariff hearing on Japanese crab canning.

The CHAIRMAN. What presentation did you people make at the hearing, with respect to the importation of crabmeat, in the Geneva Conference?

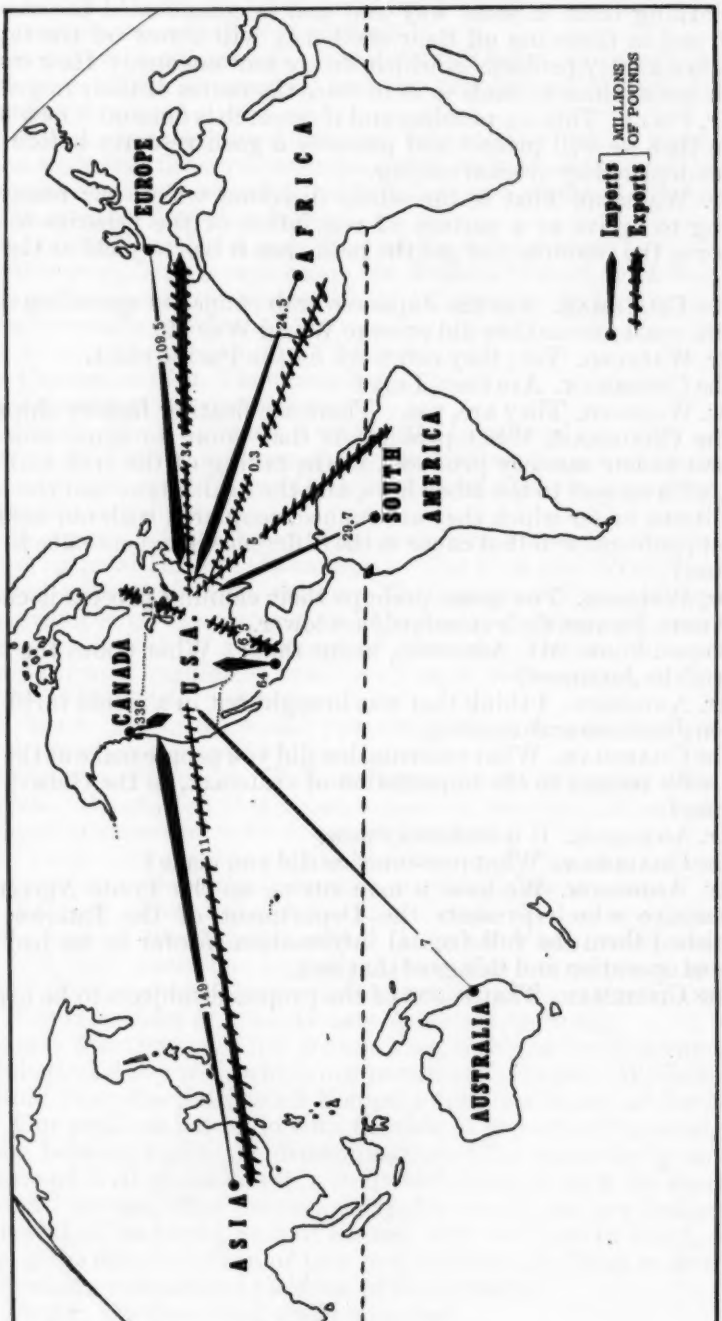
Mr. ANDERSON. It is underway now.

The CHAIRMAN. What presentation did you make?

Mr. ANDERSON. We have a man sitting on the Trade Agreements Committee who represents the Department of the Interior. We furnished them the full factual information insofar as we had it on costs of operation and things of that sort.

The CHAIRMAN. That is one of the proposed subjects to be brought in.

UNITED STATES IMPORTS AND EXPORTS OF EDIBLE FISHERY PRODUCTS 1953.



Source: Report No. FT 110 Imports and 410 Exports, United States Imports and Exports of Merchandise for Consumption, 1953.

Mr. ANDERSON. The Japanese crabmeat is a serious competitor of domestic crabmeat. Practically all of the domestic crab operators appeared before the Trade Agreements Committee to state their opposition to any change in tariff.

The CHAIRMAN. And you are on record supporting that?

Mr. ANDERSON. We supplied them with a lot of information.

The CHAIRMAN. I mean, you are on record as supporting whom, the American crab canner or whom?

Mr. ANDERSON. We are on record in the Trade Agreements Committee. That is where we make our statement.

The CHAIRMAN. I know that you are. But as to what are you on record?

Mr. ANDERSON. Unfortunately that is confidential. We are not permitted to report that.

The CHAIRMAN. Every time I ask anybody that, that is confidential.

Mr. ANDERSON. We have to report that directly to the Committee and to the President.

The CHAIRMAN. I think that is a question in which it is fair for this committee to show interest.

Mr. ANDERSON. I can assure you that we have a qualified man who is fully aware of not only the crabmeat situation but fillets and everything else.

The CHAIRMAN. Prior to World War II our canners were about run out of business on the Pacific coast and otherwise by this same situation.

Mr. ANDERSON. That is correct.

The CHAIRMAN. Are there any questions?

Mr. TUMULTY. Do I take it that your question will or will not be answered?

The CHAIRMAN. Sir?

Mr. TUMULTY. I was wondering will your question be answered.

The CHAIRMAN. I understand the situation in which the witness finds himself.

Mr. TUMULTY. I mean from the people who have that information.

Mr. ALLEN. Mr. Chairman, I think it would be true that if the foreign nation knew the best deal we would make in advance we would not get any break on the bargaining. Is that the purpose?

Mr. ANDERSON. That is the question. All of this information is kept strictly secret because, as Congressman Allen mentions, if they know how far we will go, that gives them an advantage.

Mr. TUMULTY. May I ask one question about this manual which I have? This is designed for whose reading?

Mr. ANDERSON. That is designed for anyone who buys fresh and frozen fish. It is on sale at the Government Printing Office.

Mr. TUMULTY. Do you have in mind the housewife?

Mr. ANDERSON. The housewife would get some use out of it, but not a great deal. We have other leaflets that would be better for the housewife.

Mr. TUMULTY. I suppose that would be made available upon request?

Mr. ANDERSON. We have recipes for the housewife and leaflets that tell how to keep frozen fish in the home freezer.

Mr. TUMULTY. Can they be obtained in great numbers?

Mr. ANDERSON. In fairly substantial numbers. We are not permitted to distribute them in hundreds or thousands, for example.

Mr. TUMULTY. I was thinking of enough to distribute to the League of Women Voters clubs.

Mr. ANDERSON. It depends on the volume.

Mr. TUMULTY. Have you done anything in the nature of a comic-book type?

Mr. ANDERSON. No, although a lot of our publications have illustrations as to how to fillet a fish, and so forth, which are something on the comic-book style.

Mr. TUMULTY. I thought they might prove helpful to promote the consumption of fish, which, as I understand, is not as heavily caloric as some people say.

Mr. ANDERSON. We stay a little away from direct contact with the housewife. We believe that the industry should do more of that. We work with the restaurant owners, the dietitians in institutions.

Mr. TUMULTY. Do you work with hospitals?

Mr. ANDERSON. Yes, sir; because with the small number of people and funds that we have we can do better in that way.

Mr. TUMULTY. I have no further questions.

Mr. THOMPSON. Do you make this information available for reproduction by the industry?

Mr. ANDERSON. Yes; anything that we produce can be reproduced by the industry at no cost. They do it in many cases. In many cases we furnish them information and they develop their own booklets and leaflets.

The CHAIRMAN. Mr. Allen?

Mr. ALLEN. Mr. Anderson, I think you said something about the Japanese floating canneries being on the Pacific coast. It is true so far as salmon is concerned that under the treaty they stay to the west of 175° east longitude, I believe?

Mr. ANDERSON. That is correct.

Mr. ALLEN. Is there any similar restriction on any of the other fisheries for halibut or crab?

Mr. ANDERSON. Yes. They have said they will not come into the halibut fishery. That is included in the treaty also, and the Canadians will not come into, let us say, our Bristol Bay fishery.

Mr. ALLEN. The situation is pretty well agreed upon, except as to any agreement with Russia or China?

Mr. ANDERSON. That is right. Of course, this whole matter is under study and research now, and it is conceivable that those boundary lines could be changed and some of the decisions could be changed, but for the time being the Japanese for the moment at least are staying on their own side.

Mr. ALLEN. Is there enough money for the salmon research problem?

Mr. ANDERSON. Well, some funds from the Saltonstall-Kennedy Act were devoted to salmon research just a short time ago and will permit us to carry out some of the research this year.

Mr. ALLEN. I have forgotten the figures, but it seemed to me that there was about $1¼ million a year going to tuna. However, I never heard the figure going to research on salmon.

Mr. ANDERSON. You mean $1¼ million from the Saltonstall funds?

Mr. ALLEN. No; from Fish and Wildlife, from Federal funds. I think about three-quarters of a million or a little more was going in the Pacific Ocean fishery investigation and around $150,000 a year on the Inter-American Tuna Commission and the bait research.

Mr. ANDERSON. About that; yes.

Mr. ALLEN. There was another which I think brings it up to about $1¼ million. I was curious to know the comparable figure with regard to research on the salmon.

Dr. WALFORD. It is about $400,000 with Saltonstall funds on salmon.

Mr. ALLEN. Does that amount to enough to do a comparable job on the salmon fishery as is being done on the tuna fishery?

Dr. WALFORD. No; it is a very different kind of problem than the tuna problem, and it is not nearly enough to cover that vast area that I showed you.

I showed those more than 1,000 rivers in Alaska and said every river has its own complex of races of salmon and therefore every river has a different problem. So it is an exceedingly expensive job and the amount of money we have is not enough.

Mr. ALLEN. Once more, I am not sure of my memory, but it seems to me that I recall that the salmon pack was at one time in excess of 8 million cases and that in recent years it has been down to 2 million and 3 million cases.

Would that indicate that the fishery resource is being exhausted or not being built back?

Dr. WALFORD. It is a very complicated problem, Mr. Allen, because there are a number of causes of this diminution. It is true that the production of salmon has declined, that is the abundance of salmon has declined. This is partly the consequence of fishing and it is very largely the consequence of a change of environmental conditions so that some species of salmon have actually shifted their range southward as the oceanic conditions have changed.

Mr. ALLEN. Thank you.

The CHAIRMAN. Who is going to discuss the use of the Saltonstall-Kennedy funds? You mentioned it here once or twice.

Mr. ANDERSON. I mentioned that we were using Saltonstall-Kennedy funds. I can give you a brief rundown.

The CHAIRMAN. I think the record should show what you are doing with those funds.

Mr. ANDERSON. In exploratory fishing, for example, we have a program with the Maine sardine industry and with the branch of fishery biology a joint project to study the Maine sardines.

The CHAIRMAN. The Maine sardines?

Mr. ANDERSON. The Maine sardines; yes.

I believe we have allocated there about $160,000. In addition in exploratory fishing we are now operating the trawler *Delaware*, the one that carried out the freezing-fish-at-sea experiments. We are using that to do exploratory fishing off New England at about $160,000.

In technological research there has been allocated $40,000 to study the freezing of southern oysters. Southern oysters differ from northern oysters in that they do not freeze well. They have to be used either fresh or canned. If they could get into the frozen market, it

would be of considerable advantage to them. The problem is that the southern oyster when you freeze it that it outdrips, as they say in technical terms.

We have allocated these funds to the University of Florida, the University of Louisiana, and Tulane University.

The CHAIRMAN. Where are these oysters produced?

Mr. ANDERSON. Primarily in the gulf and partly up the South Atlantic.

If the problem can be worked out satisfactorily, it will be of interest to the people as far north as the Chesapeake. We also have allocated funds in technology for work on fishery standards. One hundred thousand dollars is being devoted to that particular problem to develop the standards, to develop particular tests, and to work with the industry to get them underway.

In addition to that there is something over $200,000 which has been allocated to studies in fish meal and fish oil. The fish-oil studies, as I mentioned, are to determine the composition of the fish oil and to find new products that can be made from the fish oil.

The CHAIRMAN. Where are those studies being made?

Mr. ANDERSON. Those studies will be done, partly in our research laboratories like College Park and Seattle and Boston, but a large part will be contract research probably with the Hormel Institute, with the Armour Foundation, with certain universities and possibly with the Department of Agriculture.

We are going on the basis of buying the brains that already know about these things rather than to try to develop personnel and facilities ourselves. Agriculture, for example, in one of its regional laboratories has done a lot of work on the composition of I believe it is cottonseed oil, and most of the basic research there will be of very great help to us in fish oil.

In fish meal the big problem is to develop an index of the quality of fish meal. Fish meal is very important to the agriculture industry. Practically all poultry diets contain about 5 percent fish meal and in a lot of hog diets they use one pound of fish meal to take the place of 8 pounds of corn.

Our big problem there is to have a uniform fish meal. We do not know why fish meal varies so much in quality. One sack of fish meal will give very good results and the next sack will give much poorer results. The industry has clamored for quite a while for an objective test that we can use on fish meal to determine its value. Again we will do part of the work in our own laboratory and part with the universities and other people.

In our statistical work we have allocated I believe about $160,000 to improve our statistical coverage. One of the complaints that we have gotten for years from the industry is that we do not issue our information promptly enough. A substantial amount of these funds will go to expediting release of information. Another substantial portion goes to getting more complete coverage.

For example, in the Gulf of Mexico, we are carrying out a very extensive biological program on shrimp now and need a lot of statistical information for the biologists to use. We also need a lot of information for marketing and similar purposes. Formerly, we had one man covering the whole gulf from Brownsville, Tex., clear over to Florida.

Now we are able to put 7 or 8 people in that same area and will be able to give very firm information on the shrimp industry, which at the moment is the most valuable industry we have in this country.

I think the other allocation we have is in the marketing and educational field. Before the Saltonstall-Kennedy Act was passed we did have a transfer fund of $175,000 annually which Agriculture transferred to us to use to develop markets and conduct an educational service, and so on.

Under the Saltonstall-Kennedy Act, we have increased that fund to $300,000. There is an additional $125,000. We are spending that largely on expanding our school-lunch program.

In the school lunch, as was shown on one of the charts here, you would probably be surprised to learn that 1 meal out of 8 served away from home is served in the schools. We have done a lot of work in the national school-lunch program in introducing fish into the meals. Wherever we worked with the schools we found that it has increased consumption greatly and the industry has appreciated it a great deal. It is a field in which it is difficult for them to get in without Government help because the program is handled by the Department of Agriculture and by the State school supervisors, and it would be difficult to work in unless the industry could unite on some program. It is a field in which we have had excellent results and the industry has followed right along with it.

In Alabama, for example, one concern there follows up so well that they have one man who does nothing but contact schools and sell fish to them.

Our work in the school-lunch program is to develop recipes for preparing the fish, to carry out demonstrations for the school-lunch supervisors, cafeteria supervisors, show them how it should be prepared. Then our marketing specialists tell the schools where they can get the proper kind of fish and at a reasonable price.

I think that covers all of our Saltonstall funds except $143,000 for expanded economic research.

The CHAIRMAN. What are you doing in the shellfish area? You spoke about crabs I know in shellfish. But what about the other areas under this Saltonstall-Kennedy fund? Are you using any of that money for studies in the production of shellfish?

Who is going to discuss the shellfish here? Nobody has discussed it so far.

Mr. ANDERSON. The only work we are doing on shellfish is the oyster study.

The CHAIRMAN. You have not discussed that yet.

Mr. ANDERSON. In our exploratory work we are doing nothing on shellfish except of course shrimp.

The CHAIRMAN. You are not doing anything on oysters?

Mr. ANDERSON. We are not doing anything on oysters.

Mr. DAY. Dr. Walford has some information on work being done in the way of research on shellfish, Mr. Chairman.

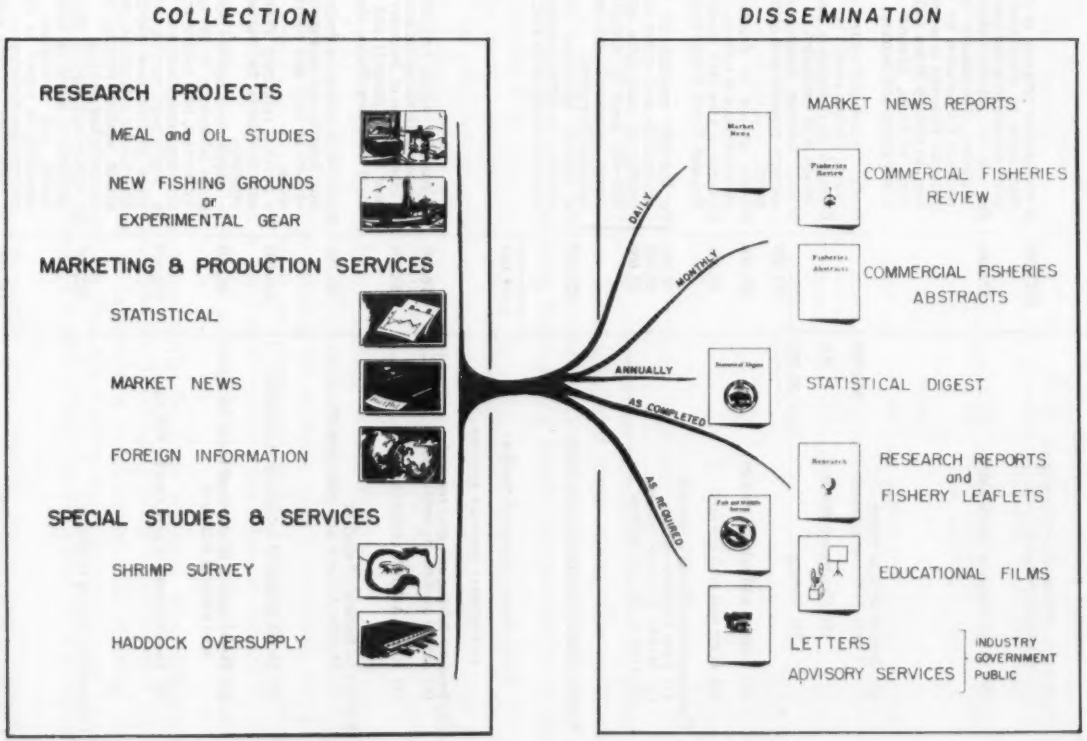
The CHAIRMAN. What do you mean by "research"?

Mr. DAY. Biological research.

If I may at this point I have a complete breakdown here, sir, of the projects which have been approached under the Saltonstall-Kennedy money showing the type of research, the amount of money, and the nature of the program. I would like to insert that in the record.

The CHAIRMAN. That may be put in the record at this point.

PRACTICAL APPLICATION OF FISHERY RESEARCH AND SERVICES



(The information referred to follows:)

Analysis of approved programs conducted under Saltonstall-Kennedy appropriation, fiscal year 1955

		Amount	Nature of program
FISHERY BIOLOGICAL STUDIES			
1. Coastal and offshore fishery research:			
(a) Pilchards research		$125,000	A cooperative program of research on fluctuation in abundance of Pacific pilchard anchovy and mackeral.
(b) North Atlantic trawl fishes		279,000	For use of Atlantic States Marine Fisheries Commission and International Commission for Northwest Atlantic Fisheries to secure information on biology of sea scallop, flounders, whitings, advance studies of ocean perch, and herring.
(c) Gulf of Mexico fishes:			
(1) Red tide research	$20,000		Study of causes and control of toxic red tide in Florida coast.
(2) Menhaden research	71,000		Research on population, age, and distribution of menhaden.
(3) Shrimp	80,000		Mainly contract research on shrimp nursery grounds and shrimp movement.
		171,000	
(d) Salmon and related species		130,000	Studies at sea to determine racial characteristics of salmon.
(e) High seas crab research		50,000	Research of king crab stocks of Bering Sea and North Pacific Ocean.
2. Commercial shellfishery research:			
(1) New England oysters		25,000	To intensify research on predators, dependable seed oyster supply, and quality of marketable oysters from different areas by strengthening research personnel and facilities at existing laboratories.
(2) Middle Atlantic oysters		25,000	
(3) Gulf of Mexico oysters		25,000	
3. Pacific oceanic fisheries investigations		234,000	To provide additional research on albacore, to define location of stocks in waters north of Hawaii.
Total, fishery biological studies		1,064,000	
COMMERCIAL FISHERY STUDIES			
1. Exploratory fishing and gear research:			
(a) Maine sardine explorations		76,000	To intensify regular program in cooperation with biological studies.
(b) North Atlantic explorations		160,000	To intensify use of *Delaware* to explore new fishing grounds and to experiment with new fishing methods.
2. Fishery technological studies:			
(a) Middle Atlantic and gulf research		40,000	To develop proper methods for handling, freezing and packaging Southern oysters in Gulf and South Atlantic areas.
(b) Development of voluntary standards		100,000	To develop voluntary Federal grades and standards for various fishery products.
(c) Development of chemical index for nutritive value of fish meal.		65,000	To supplement current research program laboratory work to be done by Service, field testing by universities, etc., under contract.
(d) Development of new uses for fish oils		170,000	To supplement current research program to find new specific uses for fish oils for a favorable competitive status against existing surplus of domestic fats and oils.
3. Commercial fishery statistics		165,000	To supplement existing annual appropriations to speed up release of statistics and strengthen coverage, especially in regard to shrimp and cold storage statistics.
4. Commercial fishery economics		143,000	To supplement existing studies, especially canned fish consumption study, and economic surveys of shrimp, scallops, Maine sardines and salmon.
5. Fishery educational and market development		300,000	To provide a firmer program in lieu of operations previously financed under agreement with Department of Agriculture under Public Law 393, including in addition to old program expansion of school lunch, locker and special marketing program and development of foreign markets.
Total, commercial fishery studies		1,219,000	

Analysis of approved programs conducted under Saltonstall-Kennedy appropriation, fiscal year 1955—Continued

	Amount	Nature of program
CONSTRUCTION		
1. Preliminary survey and engineering:		
(a) Woods Hole laboratory	21,000	Tentative plans include reconstruction of fishery biological laboratory at Woods Hole, Mass., and additions to the Seattle, Wash., laboratory.
(b) Seattle laboratory	17,500	
2. Preliminary planning only:		
(a) Pascagoula	2,000	Tentative plans include construction of new laboratories at Pascagoula, Miss., and Boston, Mass.
(b) Boston	2,500	
Total, construction	43,000	
ADMINISTRATION	91,500	An amount of 5 percent of program costs for administrative overhead.
Grand total	2,417,500	

RECAPITULATION

Fishery biological studies	$1,064,000
Commercial fisheries studies	1,219,000
Construction	43,000
Administration	91,500
Total	2,417,500

Dr. WALFORD. Our biological research on shellfish covers the clam resources which extend from New England clear along the Atlantic coast, soft clams being concentrated northward and hard clams southward, and on oysters extending from Long Island Sound down as far as Pensacola, Fla.

We have not engaged in any oyster research westward of Pensacola. The problem of greatest interest in Long Island Sound has to do with determining what the aquatic factors are which control the setting of oysters. The frequency of good sets of oysters is very rare.

I said earlier that up in Long Island Sound they get a good set in something like every 9 years. We are looking ahead to the time when we can actually control the setting of oysters under artificial conditions, perhaps even artificially propagating oysters so as to produce seed to oyster growers at a very economical cost and, in order to do that, we have to learn how to get oysters to set under laboratory conditions.

There we are experimenting with feeding oysters the different species of micro-organisms, that is, feeding young oysters and also inducing oysters to spawn in laboratory conditions and tracing the course of the larval growth in the laboratory and determining what chemicals and other qualities of water affect the survival of the infant oysters.

In Chesapeake Bay we are working to develop methods of farming oysters profitably. That appears to be the best way to restore the oyster resource in that area. Chesapeake Bay is the center of the distribution of that animal. The production of oysters in Chesapeake Bay is still the highest of anywhere along the Atlantic Coast.

There is a problem there of demonstrating to people in the oyster industry how they can be farmed profitably, demonstrating it so

dramatically that the oyster men themselves will realize that that is the thing they must do.

In Beaufort, N. C., we have a laboratory doing some very interesting work on the nutrition of oysters. It had always been a mystery as to what oysters eat. Looking in their stomachs does not provide the answer because they take out of the water what comes and digest what they need.

Thanks to a grant from the Atomic Energy Commission we have established a laboratory in Beaufort where we first of all cultivate different species of minute plants which we believe oysters probably eat, and we have to cultivate these different kinds of micro-organisms so as to get a pure culture of each one. Then we feel them radioactive isotopes. We put the isotopes in water. They become taken up by the micro-organisms. We feed those to the oysters. If the oysters digest those micro-organisms then following their digestion of those radioactive micro-organisms, we can trace in their flesh where they have gone so that we not only know what they eat but what parts of the body they have contributed to. We find that out by slicing the oysters very, very fine, and laying these thin slices on an X-ray plate and the slices take their own X-ray.

Then in Pensacola the idea we are working on is to study the genetics of oysters because if we are ever to have oyster farming we have to be able to select stocks just as cattle ranchers do. Some stocks are resistant to particular diseases. Some grow faster. Some are obviously better for northerly waters and others better for southerly waters. What we hope to do there is first of all to distinguish the particular stocks and then to recommend to oyster growers which ones to use for their areas.

Now, the most serious problem of all on oysters is the control of enemies. There is an allotment from the Saltonstall-Kennedy funds to work on that problem. That really is a tough one. The principal predator is a snail which bores a hole in the oysters and sucks out their flesh. This snail occurs all along the coast. It is a very prolific and very, very destructive thing.

What we have to do is to find some enemy of the snail, I think. We must find a disease or a predator that affects the snail but not the oyster.

Mr. TUMULTY. That is bacteriological warfare.

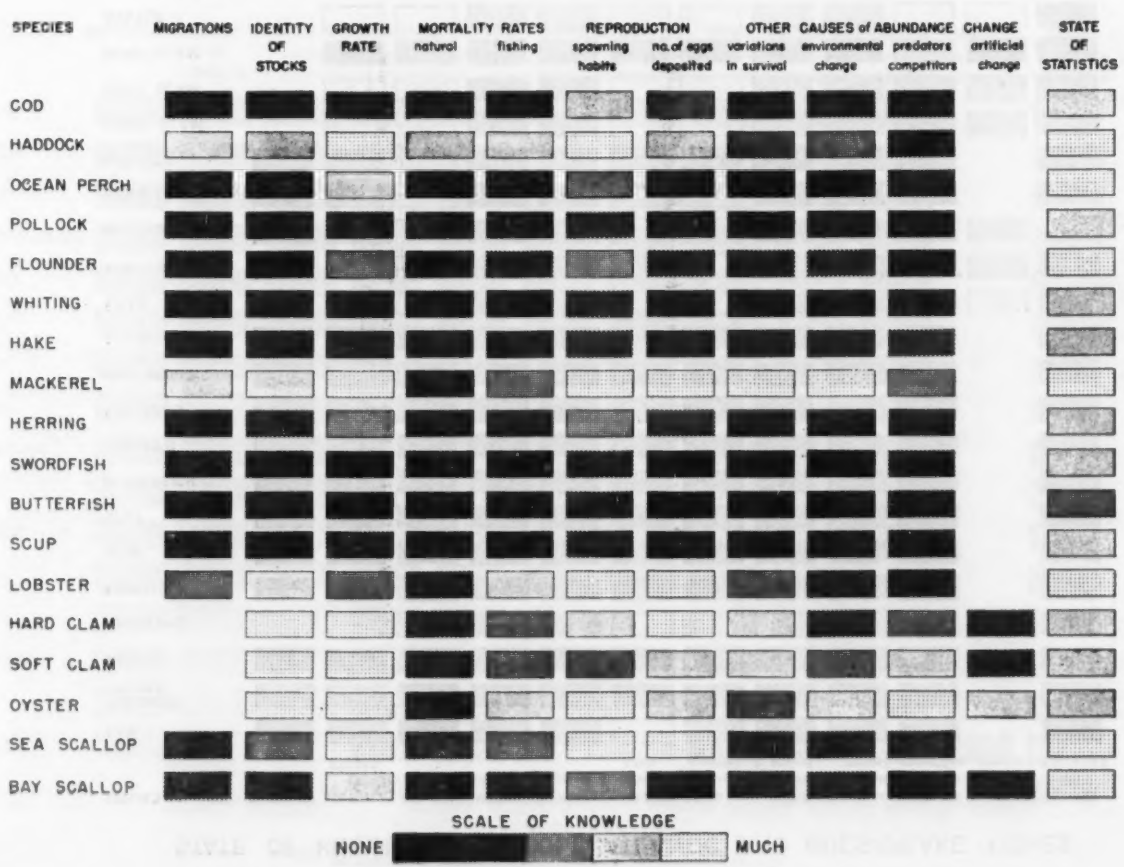
Dr. WALFORD. Yes.

I do not think fishing for the snail would do any good. We put out traps and just reduce the competition for the survivors so that they can reproduce more significantly. It is a difficult problem.

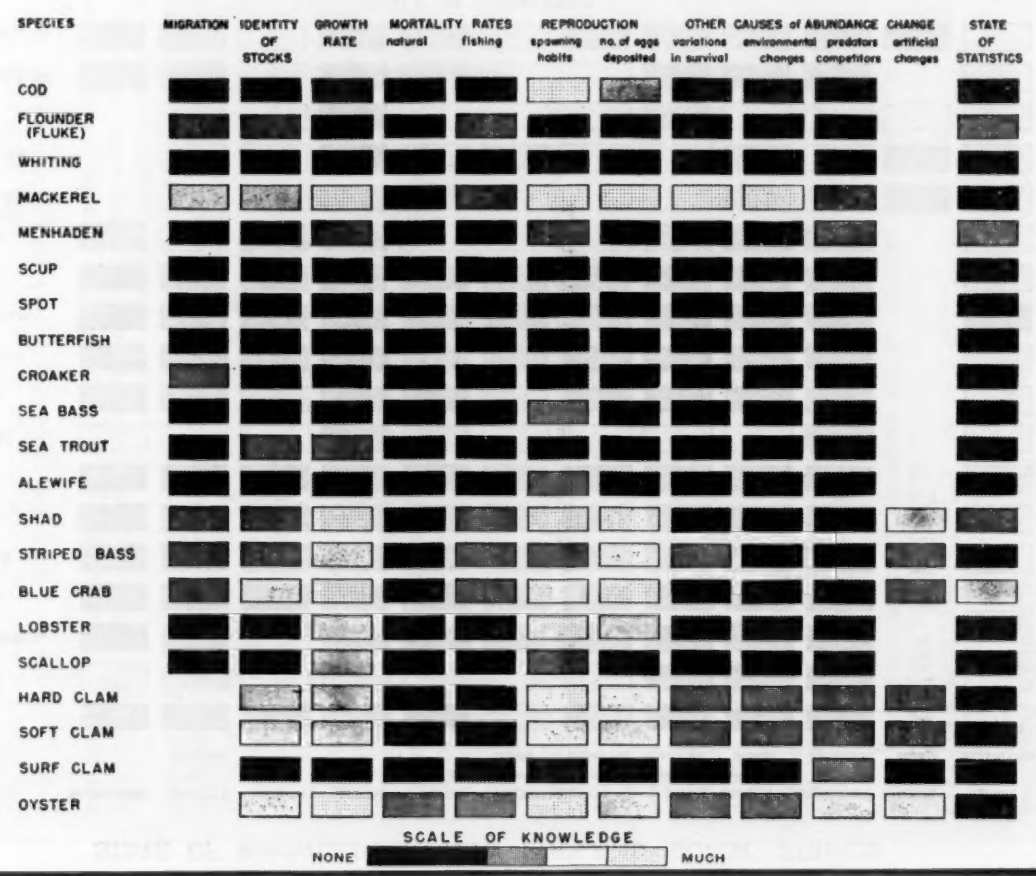
We have in this fashion shown the areas of ignorance about various problems that we must deal with. About every species of fishery resource we have got to learn certain facts in order to learn what is needed for scientific conservation of the species. We have to learn the results of their migrations. We have to learn the growth rates, the mortality rates, the rate of reproduction, the spawning grounds and the various influences in the environment on the abundance of the species, and we have to have very good statistics on the catch.

These black areas represent complete ignorance. The very palest areas represent a good deal of knowledge.

STATE OF KNOWLEDGE – NEW ENGLAND COAST FISHES



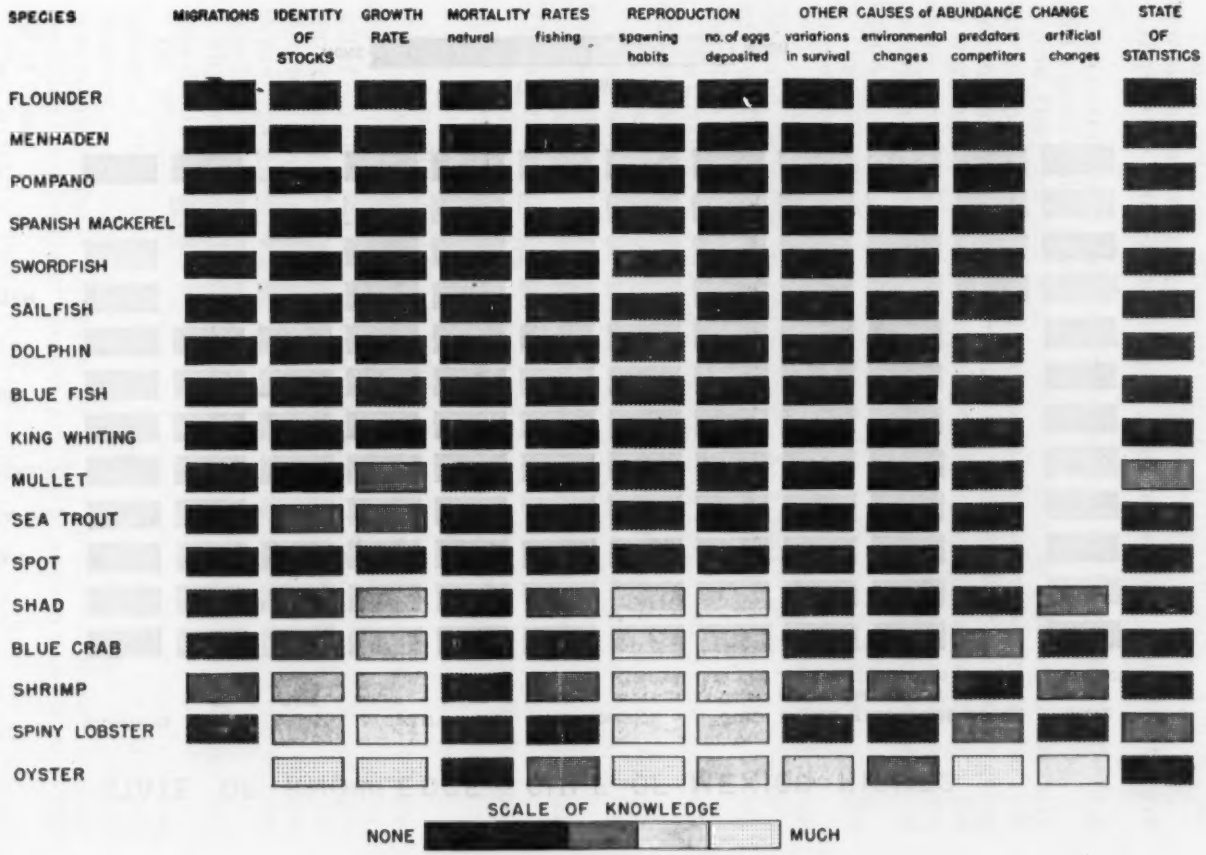
STATE OF KNOWLEDGE – MIDDLE ATLANTIC AND CHESAPEAKE FISHES



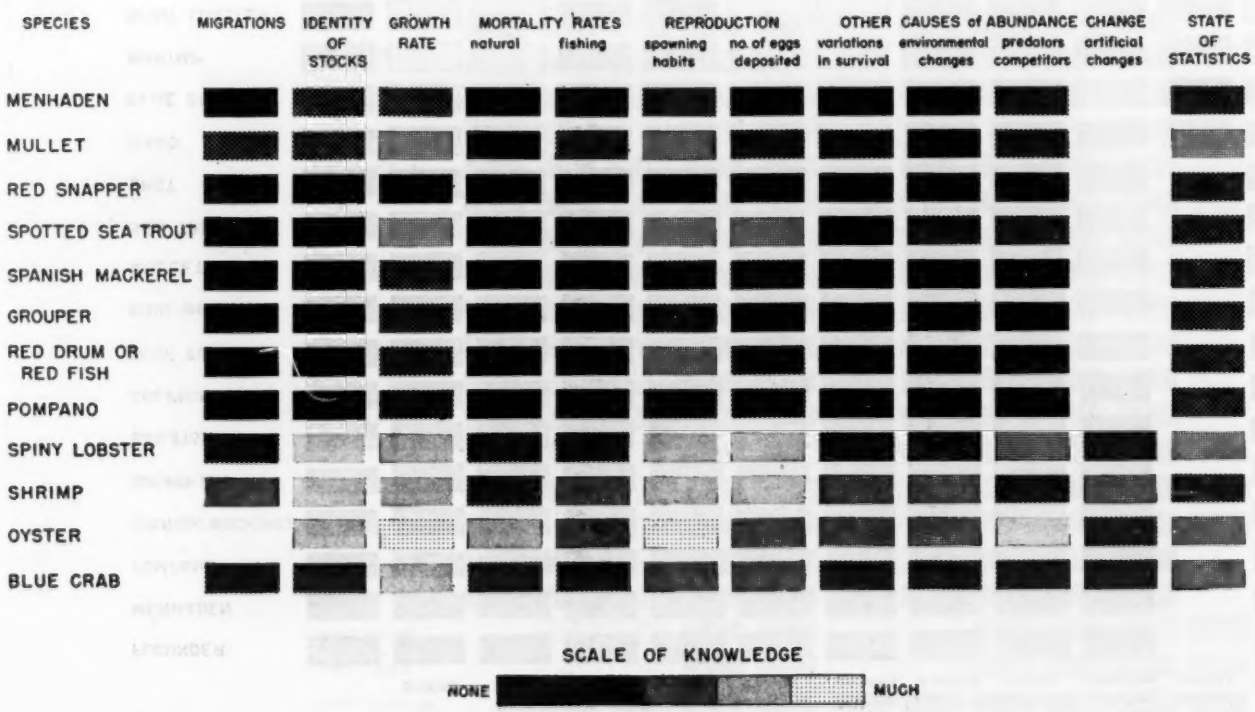
STATE OF KNOWLEDGE – SOUTH ATLANTIC FISHES

SCALE OF KNOWLEDGE
NONE MUCH

STATE OF KNOWLEDGE – SOUTH ATLANTIC FISHES



STATE OF KNOWLEDGE – GULF OF MEXICO FISHES



You can see here. These are Gulf of Mexico animals. You can see how much black there is.

Here is the South Atlantic area. You can see how much black there is.

Let us try a very well studied place like New England, and there is still a good deal of black.

Now, the funds that we are receiving from the Saltonstall-Kennedy bill will permit us to concentrate on some of these black areas so that we can make this chart paler than this. In New England we are going to work on the whiting, the yellow-tail flounder, the sea scallops, the ocean perch and herring. We are able to activate the *Albatross*, our research vessel, which has been laid up for several years for want of funds.

The CHAIRMAN. Are oysters on the increase or decrease on the Atlantic coast?

Dr. WALFORD. In Chesapeake Bay it is on the decrease, but in New England, curiously, on the increase. As a matter of fact, it is so long since oysters had occurred in the Gulf of Maine that people had almost forgotten about it.

The CHAIRMAN. Have they increased to a remarkable extent or is it just noticeable?

Dr. WALFORD. They have increased enough to start a small fishery.

The CHAIRMAN. Are they on the increase or decrease south of the Chesapeake?

Dr. WALFORD. I would say they are stabilized in the Atlantic area. There is no striking decrease.

The CHAIRMAN. What are you doing in that area to try to do something for the production of scallops and oysters?

Dr. WALFORD. For the South Atlantic area?

The CHAIRMAN. That is right.

Dr. WALFORD. That is where we have the laboratory engaged in the study of the food for the oysters. That is not a regional laboratory. All of our oyster laboratories are engaged in different problems of wide application so that the work going on in Long Island Sound is all directed toward the idea of finding out how to propagate oysters, how to propagate seed so that oysters of known genetic strain can be produced for particular areas.

The CHAIRMAN. Is the decrease in this Chesapeake and northern area due to pollution?

Dr. WALFORD. The decrease in Chesapeake is due primarily to the habits of the oyster industry. Maryland oystermen are extremely resistant to farming oysters. If they would farm oysters the production would increase. However, it is very firmly established in their tradition that the oyster grounds are free to anyone who comes to fish off of them.

The CHAIRMAN. This is a matter within the scope of the State department of conservation and fisheries?

Dr. WALFORD. That is right.

The CHAIRMAN. You cannot break through that?

Dr. WALFORD. That is correct.

The CHAIRMAN. That is true in a lot of other States?

Dr. WALFORD. That is correct; yes, sir.

The CHAIRMAN. With respect to shellfish and other edible fish?

Dr. WALFORD. It is particularly true southward, I think, that there is that resistance to making use of knowledge in the cultivation of grounds.

The CHAIRMAN. I asked a question about the shrimp, the mode of shrimping which is killing a lot of edible young fish. You made a study on how to eliminate the destruction in cod fish or halibut. Are you doing anything to eliminate the destruction of small fish in the taking of shrimp?

Dr. WALFORD. We have not tackled that, sir. It seems to me that that would come in the scope of our shrimp investigation.

The CHAIRMAN. Someone talked about that.

Dr. WALFORD. You asked me about that a little while ago, and I answered that we had just started our shrimp investigation.

The CHAIRMAN. Doctor, if you ever went out on a shrimping fleet and saw the operation you would know how serious the situation is on the killing of small fish. It is a serious thing. If you are going to spend funds to do this and that and there is some way to find a way to take shrimp without taking all the small seedling fish that would be fine.

Dr. WALFORD. That question has also been asked us by the Atlantic States Marine Fishery Commission. They are concerned about that same problem.

The CHAIRMAN. It is noticeable where shrimping is heavy that the other types of fish have disappeared.

Dr. WALFORD. You are thinking, I imagine, of the croaker which has declined.

The CHAIRMAN. And the gray trout, the bottom fish have disappeared where shrimping is heavy.

Dr. WALFORD. It is not at all certain that the diminution in croakers is the consequence of the shrimping, however.

The CHAIRMAN. They were there before and are not there now. The gray trout were there and are not there now.

Dr. WALFORD. That is true.

The CHAIRMAN. What is it?

Dr. WALFORD. All I can do is suggest a theory to you. That is the theory that our people have that the croakers—that includes trout which is a kind of croaker—are now in a down cycle of abundance.

The CHAIRMAN. The croaker and the trout are the two small fish that you kill in the process of shrimping.

Dr. WALFORD. That is a matter which we would have to study in relation to our shrimp investigation, and we will study that question because you are interested in it and also because the Atlantic States Commission is interested in it.

The CHAIRMAN. I am interested in the whole subject, but it happens that I do know a little more about what is going on in the field of this particular incident.

Dr. WALFORD. I know that the croaker has declined not just in the South Atlantic States but even farther northward.

The CHAIRMAN. Are you going to make a study and try to find some way of taking shrimp without killing all the small fish?

Dr. WALFORD. Yes, sir.

Mr. THOMPSON. Mr. Chairman?

The CHAIRMAN. Mr. Thompson?

Mr. THOMPSON. What is the population of the gulf? Are they increasing?

Dr. WALFORD. I believe it is increasing.

Mr. THOMPSON. I wonder what the effect is going to be of the development of oil resources in the so-called tideland and whether or not you have made any study with respect to the effect of well drilling on the oysters.

Dr. WALFORD. We have not done that, but the State agencies have given a great deal of attention to it.

Mr. THOMPSON. I know the oil companies made grants to Louisiana laboratories for study, but I did not know what the results were.

Dr. WALFORD. The results were somewhat confusing because there were two groups working on the problem. We have not been engaged in that problem at any point, but there is a difference of opinion as to the relation between the oil operations and the abundance of oysters.

Mr. THOMPSON. I would suggest that the oil operations are going to increase terrifically in the gulf and the gulf is one of our most valuable fishery areas. I wonder what your plans were for the future. As this oil industry increases, you are certainly going to have a greater pollution problem there. What are your plans for the future of making a project of that particular problem?

Dr. WALFORD. We have made no plans. If your committee will put this up to us we will work on that problem.

Mr. THOMPSON. The Louisiana department has done a great amount of work on shrimp and oysters. The oil companies for good public-relations purposes are putting money in the fund and I do think that the Federal department could give invaluable aid because of your knowledge of research already done. I am sure it would be welcomed by all the States.

The CHAIRMAN. It would seem that if States and private industry are working on it then certainly the Fish and Wildlife Service should be interested in making it a three-way study.

Mr. THOMPSON. That might affect the resource of the shrimp that are located near the coastline. You mentioned that the population of shrimp is diminishing closer in and you are having to go farther out to get red shrimp. Many people are interested in learning what the answer is there and when the tidelands are developed you are going to have a terrific problem of oilfields. That will be a problem.

Dr. WALFORD. I should think that would automatically come to our shrimp study which would have to know what affects the survival of the young shrimp. They spawn 200 miles off the coast, and then the eggs drift in toward shore, and the relation between any qualities of water at all, including substances which pollute the water, would come within the scope of our investigations.

Mr. THOMPSON. Have you had any requests from the Louisiana Department of Fisheries for assistance in the research on oysters in that connection?

Dr. WALFORD. No, sir; we have not.

The CHAIRMAN. Mr. Allen?

Mr. ALLEN. Dr. Walford, the question about what are you going to do next, brings to mind the provision within the Saltonstall-Kennedy bill for an advisory committee. I wonder if that committee ever got appointed or what is the nature of the background of the members on such a committee?

Dr. WALFORD. Mr. Day is that one which you might answer?

Mr. DAY. That committee, Mr. Allen, is being set up. Nineteen members have been selected and appointed so far from industry from all parts of the country. No meeting has been held. It takes a long time to get people appointed these days with security clearance and all of the things that go with it. The 19 members of the committee have been appointed. It has been announced and plans are in the making for a meeting I think reasonably soon.

The CHAIRMAN. How many are there?

Mr. DAY. We talked in the first instance about something like 24. It is almost completed.

Mr. THOMPSON. I wonder what the relative representation is from the various areas.

Mr. DAY. It was widely selected from various areas and various segments of the industry.

Mr. ALLEN. What did you get—scientists, marketing experts, and practical fishermen?

Mr. DAY. Practical fishermen and, in fact, under the rules under which it is set up, trade associations cannot be represented. They must be selected from someone who is actively in the fishering industry, either a processor or handler, and someone active in the industry. These people are made up from that type of individual.

Mr. ALLEN. Is it going to be their function to advise as to what areas of research and activity are necessary and how much of the funds are to be apportioned to one or the other?

Mr. DAY. Yes; they will serve as an advisory committee to help in the overall program. The Service was faced with the proposition. The funds were made available last July. There were many areas of research and programs that needed to be carried forward.

As Dr. Walford said, we had the *Albatross* research vessel laid up for 3 years for lack of money. We have closed several stations for lack of funds. So a program was developed to carry on and implement and carry forward the things that we had discontinued because of shortage of moneys. The idea was to get it started as soon as possible and in the meantime appoint the advisory committee and ask their advice after this initial start. They will be called in for determination on all future programing of Saltonstall-Kennedy moneys.

Mr. ALLEN. That would indicate from the practical standpoint where the problems, as mentioned, should have fit in the whole scheme.

Mr. DAY. There are representatives from all segments of the fishing industry and from all portions of the country as much as can be with that number of people.

Mr. ALLEN. Are States represented by public officials?

Mr. DAY. No, the advisory committee is made up purely of industry representatives.

The CHAIRMAN. Who selects them?

Mr. DAY. The Secretary of the Interior.

Mr. ALLEN. Thank you.

The CHAIRMAN. I want to ask the doctor whether he said shrimp spawn at sea.

Dr. Walford?

Dr. WALFORD. They spawn on the Continental Shelf about 200 miles out. Then the young come in toward shore and spend the next few

months in the inland waterway, the sloughs and swamps. They spend several months there and at the end of the year go out to sea and spawn. They are annuals. As far as we know not any of them lives more than 1 year.

The CHAIRMAN. You mean the shrimp is spawned, grows, and perishes within a year?

Are there any other questions?

Thank you, Doctor. It has been a very, very interesting hearing.

The committee will adjourn and meet tomorrow morning at 10 o'clock.

(Thereupon, at 12:40 p. m., the committee recessed to reconvene at 10 a. m., Wednesday, March 9, 1955.)

59878—55——11

STUDY OF THE OPERATIONS OF THE FISH AND WILDLIFE SERVICE

WEDNESDAY, MARCH 9, 1955

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D. C.

The committee met at 10:05 a. m., pursuant to recess, in room 219, Old House Office Building, Hon. Herbert C. Bonner (chairman) presiding.

The CHAIRMAN. The committee will come to order.

Our first witness is Dr. Meehean, assistant to the director of the technical services.

Dr. Meehean, will you give your full name and background, please, for the record?

STATEMENT OF DR. O. LLOYD MEEHEAN, ASSISTANT TO THE DIRECTOR, TECHNICAL SERVICES, FISH AND WILDLIFE SERVICE

Dr. MEEHEAN. My name is Dr. O. Lloyd Meehean, assistant to the director for technical staff services. I received my B. Sc. and M. Sc.. degrees at the University of Minnesota and a Ph. D. from Ohio State University. The field of research was in warm water fish culture. My home was in northern Minnesota near Hibbing.

I have been with the Fish and Wildlife Service since 1931 with a background in research in fisheries work in charge of the Federal hatcheries for a number of years, and I am now assistant to the director for technical staff services. These technical staff services include those portions of Service activities that involve relationships with all the other types of activities in the Service. They include the Office of River Basins, Federal Aid to wildlife and fisheries, engineering, and lands.

The two people whom you will hear this morning are the chiefs of the branches of river basins and Federal aid. The engineering and lands phases of our operations have been tied into the refuge activities and other activities of the Service so it did not seem necessary to burden you with details of those operations because they are merely operating details.

The Office of River Basins was established to study the effects of water-control projects on fish and wildlife resources and to determine ways and means of mitigating any damages that might result from such construction.

Very recently the number of Federal Power Commission projects, which are licenses issued to private individuals for the construction

of these water use projects, has increased very markedly. Because of the fact that the Administration's policy has encouraged private capital to get into this field, the result has been that there has been a flood of applications for that type of project.

Another factor in river-basin studies has been the fact that in recent years there is more comprehensive planning of these projects on a basinwide basis rather than on an individual-project basis which requires a considerable change in the thinking of conservationists because of the fact that they want to take the opportunity of improving fish and wildlife activities on these projects that are financed by Federal funds.

In the past we have been thinking in terms of mitigation of any damages. The conservationists and the State conservation departments and others are thinking now in terms of enhancement, that, is in terms of getting the most out of the dollar that is being spent on these river basin projects so it is involving us in a more complicated type of investigation.

More and more it is being realized that wildlife and fisheries well being is related to land use and these wildlife programs are entering into the planning in connection with land use as well as with water use.

The Hope-Aiken Act, for example, of last year has resulted in a much closer consideration of the effect of land use on wildlife than we have had in the past, particularly as it is related to the storage of water and to agricultural development. Consequently you can see that the river basins planning for wildlife is gradually assuming a greater and greater importance because it is so intimately tied in with water use projects and with land use projects.

Mr. Jim McBroom, who is in charge of river basins, will tell you something about their activities.

STATEMENTS OF JAMES T. McBROOM, COORDINATOR, OFFICE OF RIVER BASIN STUDIES; AND JAMES O. STEVENSON, ASSISTANT COORDINATOR, OFFICE OF RIVER BASIN STUDIES, FISH AND WILDLIFE SERVICE

The CHAIRMAN. Will you give your full name and your background?

Mr. MCBROOM. My name is James T. McBroom. I am coordinator of the Office of River Basin Studies for the Fish and Wildlife Service. I have been with the Department of the Interior for approximately 16 years. I began in 1939 as a trainee with the Bureau of Indian Affairs. Later I joined the staff of the Bureau of Reclamation, where I spent most of my time in the field. After duty in the Navy during the war, I returned to the Bureau of Reclamation in the field. I came to Washington in 1950 as a member of the staff of the Office of the Secretary of the Interior. I have been with the Fish and Wildlife Service for 2 years in this position.

I have with me Mr. James O. Stevenson, who is Assistant Coordinator of River Basin Studies.

Mr. Stevenson, will you provide your background?

Mr. STEVENSON. I have been Assistant Coordinator, Office of River Basin Studies, since May of 1946. I have been with the Fish and

Wildlife Service in research and management work since October of 1938.

Mr. ALLEN. Mr. Chairman, might we have the educational background? It is sometimes rather interesting to know what the professional side of the training might be.

Mr. MCBROOM. Yes, sir. I am a graduate of the University of Chicago in 1936, where I majored in geography. I received my master's degree from the same institution in 1939 in the same field.

Mr. STEVENSON. I graduated from Occidental College, Los Angeles, in 1930, and have a master's degree from Western Reserve University in Ohio.

Mr. MCBROOM. Mr. Chairman and gentlemen, the Office of River Basin Studies, along with the rest of the Fish and Wildlife Service, is very gratified to have this opportunity to come before you and discuss with you our program and our problems.

As Dr. Meehean has said, the Office of River Basin Studies is established to examine the effects of dams, reservoirs, and drainage ditches on fish and wildlife resources and to recommend for incorporation in the construction and operation of such projects means and measures to prevent or compensate for these damages which may occur to the fish and wildlife resources. The Office of River Basin Studies has no jurisdiction over any facility operated by the Service; our sole function is to investigate projects sponsored or licensed by other Federal agencies, and to formulate conservation measures which should be incorporated in such projects. We are concerned with both the fish and wildlife phases of these projects.

A great enlargement in the field of construction in dams and reservoirs has taken place in recent years. Some of these provide great improvement in fishing and hunting opportunities. Others cause very great damage. So it is our job, in the words of a popular song of a few years ago to accentuate the positive and eliminate the negative if we can. The statutory basis for the work of the Office of River Basin Studies is contained in the Coordination Act of August 14, 1946. By passage of this act the Congress declared it to be the policy that fish and wildlife resources would receive adequate and due consideration in the planning of these water-control projects.

Now, this applies not only to the Federal projects but to projects which are constructed under Federal license such as those issued by the Federal Power Commission. In all of our work we cooperate very closely with the State fish and game agencies. Each of those agencies also has similar statutory responsibilities under the Coordination Act.

Now the act of 1946 was passed to replace an earlier Coordination Act passed in 1934. The 1934 act provided simply that the Fish and Wildlife Service or its predecessor agencies could provide expert assistance in increasing, rearing, and stocking of the supply of wildlife. It also provided for the investigation of pollution conditions. It provided for an opportunity for the wildlife agencies to make use of impounded water. It provided for consultation with the then Bureau of Fisheries as to fishways and other fish-passage facilities at dams. But it was very largely a permissive piece of legislation. It did not provide the machinery for incorporating fish and wildlife values and fish and wildlife resources into the plans of the construction agencies.

The lack of result from the 1934 act resulted in a very great upwelling of demand on the part of sportsmen and conservationists throughout the country who had seen some pretty needless havoc wreaked on fish and wildlife resources. They had seen streams below dams dried up with the consequent destruction of all fishlife. They had seen reservoirs flood and destroy valuable habitat for both waterfowl and other species.

In all of this planning there was very little attention given to the effect on fish and wildlife resources. So the conservationists demanded that something be done about it and as a result this act was passed.

The sponsors of the act both in and out of Congress held that fish and wildlife resources have values as real as, say, a railroad which might be displaced by the construction of a reservoir and certainly none of the agencies in the reservoir-construction business would think of flooding a railroad without making just compensation to the owners. They felt that there was need for a way to get fish and wildlife into the picture.

The legislative history of the Coordination Act indicates that there was an attempt on the part of its original sponsors to give the Fish and Wildlife Service and the affected State fish and game agencies what amounted to a veto power on Federal construction plans. For example, the first bill introduced in the 79th Congress, 1st session, in 1945, included this language, and I quote:

> No impoundment, diversion, or other water-control facility shall be constructed by any agency of the Federal Government or by any private or public agency under Federal permit that does not include adequate means and measures, so far as practicable, as approved by the Fish and Wildlife Service to prevent loss of and damage to fish or aquatics.

As you see, that would require any construction agency to submit its plans to the Fish and Wildlife Service; and if those plans were not satisfactory to the Service the project could not go forward.

This provision, however, was not included in the final bill which was passed by the second session of the 79th Congress in 1946. The later version did contain a section which required the War Department to regulate the pool levels on its reservoirs in the interests of fish and wildlife, but even this provision was stricken from the bill before its final enactment.

The Coordination Act, as we have it, then, contains not one word of mandatory language requiring any construction agency to do anything for fish and wildlife resources. It gives no veto power either to the Fish and Wildlife Service or any of the State fish and game agencies, and in the report on the bill provided by the House committee and later adopted by the Senate committee, it was stated that the bill purposely was not intended to provide for the curtailment of flood control, irrigation, or other impoundment programs for the sole benefit of fish and wildlife resources.

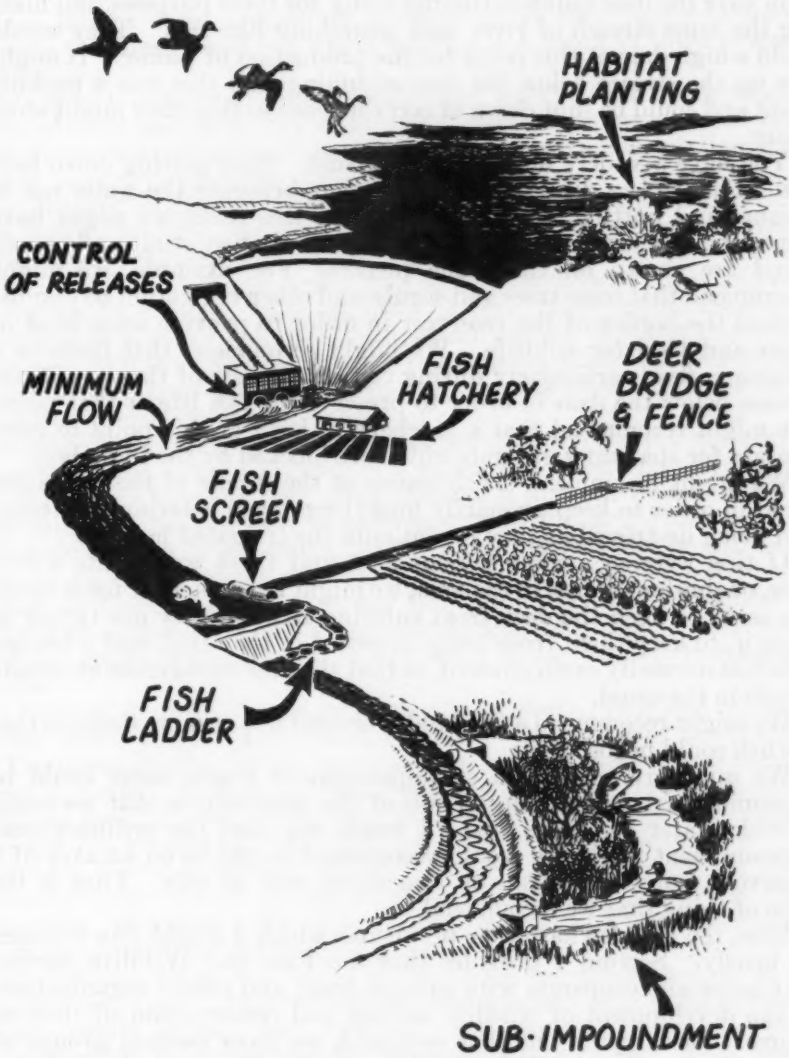
So that is what the Coordination Act does not do. It does not provide a veto power nor does it contain any mandatory instructions for any Federal construction agency.

What it does do, as we have said, is to provide a procedure whereby the Fish and Wildlife Service and the State fish and game agencies may investigate the effects of these projects in advance to determine what those effects are and to recommend compensatory measures. It

also provides that it is the policy of the Federal Government that fish and wildlife conservation must receive due consideration in this field.

Section 2 of the act, in addition to providing for investigations by the Fish and Wildlife Service and the State fish and game agencies, states that any means and measures which may be adopted for the conservation of fish and wildlife resources must be financed as an integral part of the cost of the project. It provides that the reports of the Fish and Wildlife Service on these projects shall be transmitted by the sponsoring agency to the Bureau of the Budget and the Congress as a part of its own report and provides finally that funds appropriated to the construction agencies may be transferred to the Fish and Wildlife Service in order to finance the necessary investigations of these Federal projects.

I want to make a point in connection with the act at this place to which I will refer later. It was passed in 1946 at a time when there was a very great demand for public works projects, at a time in the postwar years when it was expected that there would need to be a lot of construction by the Federal Government in order to assist the economy in converting from a wartime to a peacetime basis; therefore the act was aimed at Federal agencies that were in the construction business and agencies that were under Federal license. That is the picture under which we have worked since the act was passed.



In connection with Section 2 of the act, we have a couple of exhibits here which I would like to discuss with you. This depicts a hypothetical stretch of river in its natural state. It is slightly overdrawn as is necessary to get across the point, but you will note that it depicts fine habitat for waterfowl, fish, beaver, upland game, deer, and other species there. Just about the most positive thing we could recommend in connection with the project that might go in on this stretch of river is to leave it alone because this is theoretically a stretch of river which is just about as good as you can make a stretch of river for fish and wildlife habitat.

Of course this stretch of river, like many we deal with, also provides a lot of other water-related resource development values so you very

soon have the dam builders coming along for their purposes and making the same stretch of river look something like this. They would build a high dam at this point for the production of power. It might dry up the stream below the dam assuming that this was a peaking plant and could be shut down at certain times so that they might store water.

You have a widely fluctuating reservoir. Then getting down here you might have a diversion for irrigation, bringing the water out in a canal and putting it on the fields. At this point we might have some kind of a levee. So the types of things that we study and recommend are shown on this same picture. For example, we might recommend that some trees and shrubs and other vegetation be planted around the border of the reservoir in order to provide some kind of cover and food for wildlife. We might recommend that there be a minimum flow particularly during critical periods of the year in the stream below the dam in order to preserve the fish life at that point. We might recommend that a hatchery be built at this point to compensate for spawning grounds which are blocked by the high dam.

We might recommend a fish screen at the intake of the irrigation canal in order to keep primarily fingerlings from entering that canal and being destroyed as they go out onto the irrigated land.

If this were in a mountainous area and there were quite a few deer, or similar species, in the area, we might recommend a fence along the canal to keep the deer from entering it when they are trying to cross it, to keep them from being drowned in the canal, and a bridge, which is normally earth covered, so that the deer could cross at certain points in the canal.

We might recommend a fish ladder around one or more dams so that the fish could negotiate it.

We might recommend a subimpoundment where water could be impounded from the main stream of the reservoir so that we could provide water for waterfowl. I might say that the ordinary subimpoundment which we would recommend would be on an arm of a reservoir more often than on something such as this. That is the type of thing that we recommend.

Now, the act also has other provisions which I would like to touch on briefly. Section 1 provides that the Fish and Wildlife Service may assist and cooperate with private, local, and public organizations in the development of wildlife habitat and conservation of that resource. In carrying out that section 1, we have assisted groups of citizens such as in the Mississippi River and tributaries area, the lower valley, where they have established what they call the Mississippi Valley committee, consisting of official and unofficial conservationists.

Under section 3 of the Coordination Act, lands and water on these projects may be made available for fish and wildlife management under what we call a general plan. A general plan is primarily for the purpose of designating the reservoir and water areas which will be available for this purpose.

Section 4 as well refers to the same type of land and water management.

Since 1946 when the act was passed and the Office of River Basin Studies was established, a total of 1949 reports have been prepared following investigations by the office. These were on 1425 projects.

Now we have gotten some good results from those reports. We have gotten lots of dams around the country where there are minimum flows in the streams and fish life is thriving as a result of these recommendations.

We have a number of subimpoundments, which I described, which have actually been built into some of the Federal projects so that the Coordination Act has been a good piece of conservation legislation, but it has certain deficiencies.

In order to be effective in this field, the report of the Fish and Wildlife Service and the cooperating State fish and game agencies must enter into the engineering decisions made with respect to these projects in their earliest planning stages, just as considerations in the field of hydrology or geology. All too often, I fear, those engineering decisions have been made by the construction agency first and then the Fish and Wildlife Service and the cooperating State fish and game agencies have been called upon to evaluate the effects of those engineering decisions on the resource.

So our problem is to get our representations into both the engineering agency and to the Congress in a manner to be effective. One of the reasons we have not been more effective is that our report may be transmitted to the Congress in accordance with the act, which I have just described, as an appendix, but the appendix may not be printed, and the House or Senate document, which you gentlemen sometimes review on these, does not give any indication nor does it contain a copy of the Fish and Wildlife report and recommendation. That has been the source of a good deal of deficiency in the field of river basin studies.

I have at the desk here an example of just that. This five volume report, which I hold in my hand, represents the report of the Corps of Engineers on the Guadalupe and San Antonio Rivers and tributaries in Texas. Included in that report is a benefit, in the benefit-cost ratio analysis, of some $36,000 for fish and wildlife benefits. The fish and wildlife report is down here in volume 5 as an appendix.

Here is House Document 344, 83d Congress, 2d session, which is a printed version of only the first of the five volumes transmitted to the Congress. It refers to the fish and wildlife report on page 54 with a footnote which says "Appendix not printed."

The $36,000 which was incorporated in the economic analysis as a benefit to fish and wildlife was dependent upon the Corps of Engineers taking certain actions with respect to this project, principally the acquisition of land for wildlife management purposes. That was not incorporated in the overall plan as submitted. This project was authorized in the Flood Control Act of 1954, partially on the basis of those fish and wildlife benefits, but there was no incorporation in the authorized project plan of the recommendations on which those benefits were based.

There has been a good deal of criticism from the outside conservationists for the failure to get things done as we did here, but that may be because there is some feeling that we do have a veto power, as contained in the original bills which I described. I reiterate that we have no veto power. Nevertheless, in order to be effective, we must somehow get into the engineering decisions which are made on these projects. We must get fish and wildlife conservation into the engineering framework which is planned for these projects and, last

but not least, we must get conservation into the legal framework of these plans.

This project, for example, was authorized in the Flood Control Act of 1954 in accordance with House Document 344. Now, if our recommendation for land acquisition for wildlife management had been incorporated in that House document, that would have been authorized. That is a stumbling block because, as you will recognize, from the things that I pointed out on the chart, they cost money. Sometimes they cost lots of money. You take these measures and install these measures in the project for the conservation of fish and wildlife, there must be clear authority in order that those funds can be expended.

The CHAIRMAN. Let me ask you a question. In this specific case that you mentioned, the land was not acquired?

Mr. MCBROOM. No, sir; there was no provision made in the report.

The CHAIRMAN. It was not acquired in this project, although in the estimate of the engineers in support of the projects, it was put in as one of the benefits?

Mr. MCBROOM. That is right, sir, $36,000 annually.

The CHAIRMAN. Then when it came to Congress in the report to Congress of the engineers' investigation, it was left out?

Mr. MCBROOM. That is right, sir.

The CHAIRMAN. Then what is the next step?

Mr. MCBROOM. Well, this particular project is already authorized without that feature in it, so the next step, if there is to be any of that land acquired, will have to be authorized in an appropriation bill or in another bill by the Congress.

The CHAIRMAN. Going on with this, what is the cure for that situation? Did you call it to the attention of the committee that had jurisdiction over the original act that created this river basin business?

Mr. MCBROOM. Sir, we called it to the attention of the Public Works Committee of the House on last June 1. We testified on that very point.

The CHAIRMAN. Did they have jurisdiction over the subject?

Mr. MCBROOM. Yes, sir; they had jurisdiction over the authorization of this project.

The CHAIRMAN. I understand that, but I refer to the committee having jurisdiction over the act that created your river basin authority. Did you call their attention to it?

Mr. MCBROOM. That is right, we did not call it to the attention of that committee.

The CHAIRMAN. I do not mean to be critical. But other committees are not as interested in the legislation as the one that has jurisdiction over the passage of the legislation.

Mr. MCBROOM. We are certainly glad to know that, Mr. Chairman, and will be guided by that.

The CHAIRMAN. I do not say that as a positive fact. I say that from observation. As a rule, committees of Congress are jealous of their jurisdiction and it is the responsibility of the senior members of any committee to watch the jurisdiction and see that it is not taken away and see that in some act that the committee passed the intent of Congress is carried out. In this case that was not done.

Mr. MCBROOM. Mr. Chairman, we have tried to remedy that situation by administrative means. We took a long step in that direction

last summer with the negotiation and signature of an agreement between the Fish and Wildlife Service and the Corps of Engineers, which I believe you have in the folders before you. This agreement provides that the district engineer who initiates the report, such as the one I have on the desk, shall incorporate in the body of his signed report the substance of the report of the Fish and Wildlife Service.

Section 3 indicates that the district engineer in his signed report, which is this one which was later printed as a House document, shall incorporate in the body of his signed report language specifically accepting each of the recommendations of the Service which are considered satisfactory to him or, if they are not acceptable, he will give in his signed report the full reasons why he finds them unacceptable.

We believe that that will prevent the happening of another Guadalupe and San Antonio, where our report was lost in volume 5, not printed, and our recommendations were neither rejected nor adopted.

Section 6 of this agreement on page 2 provides that conservation of fish and wildlife shall be a stated project purpose in any project where the effect on those resources is significant. This is an advancement, we feel, from our standpoint in that the costs of the measures which I have described to you will be clearly authorized if we have fish and wildlife conservation as a stated project purpose in a report as approved by the Congress.

Sections 7 and 8 deal with general plans which have been described as the documents which designate areas of lands and waters on Federal projects for use by fish and wildlife agencies, State and Federal.

We have had considerable trouble in the past with the Corps of Engineers in arriving at a mutual understanding as to when a general plan should be executed and what it should contain. Already since August we have had a great deal of improvement in that respect—since the signing of this agreement.

Section 9, as you see, is devoted to the leases of project lands and represents the resolution of another quite vexing problem. It had been the practice of the Corps of Engineers for some time past to lease Federal lands for agricultural purposes and to permit the lessee to determine whether there would be public hunting and fishing on those lands. I believe their policy had been that if the lessee hunted himself anywhere he was to permit public hunting on the land. If he did not hunt himself, he could close it to hunting.

There again we have already received some pretty good dividends in the change of policy of the Corps of Engineers, both in California and the Middle West, and in other places, no doubt. We feel that this agreement represents some pretty good progress toward cooperation with the Corps of Engineers.

Certainly these projects are their projects. They must put together a plan. We have a modus operandi now in this agreement for getting fish and wildlife considerations into the project plan at an earlier stage.

Our annual program, as you will see, is dependent largely on the programs of the construction agencies. During the fiscal year we propose to undertake 302 investigations of projects of the Corps of Engineers, the Bureau of Reclamation, the Federal Power Commission, and some other special studies.

Mr. TOLLEFSON. May I ask the witness a question?

The CHAIRMAN. Yes.

Mr. TOLLEFSON. I missed the first part of your testimony, and possibly you discussed this thing. Out in the Northwest we are interested in power, as you know. We are also interested in keeping our salmon. Just what happens when the Army engineers propose to build a dam or the Bureau of Reclamation proposes to build a dam on the Columbia or on the Snake or wherever it happens to be? Do they automatically call that to your attention or do you have to keep tab on what they are doing?

Mr. MCBROOM. They call it to our attention, but we also do the tab keeping. We try to keep right on top of it and know when their original planning begins, so that we can make our plans accordingly.

Mr. TOLLEFSON. Whenever a dam project is brought to your attention, then you certainly talk to them about fish ladders and the like, do you not?

Mr. MCBROOM. Yes, sir. Now, our work with the Federal Power Commission, as Dr. Meehean has said, has greatly increased in recent years, in the last 2 years particularly, and we deal with those just a little differently than the projects which are under Federal auspices. We prepare our recommendations and submit them to the Department and the Department submits the comments of the Fish and Wildlife Service and all the other agencies in the same package.

I might say that the Federal Power Commission through the years has shown a good disposition to incorporate in licenses they issue measures for the conservation of fish and wildlife resources.

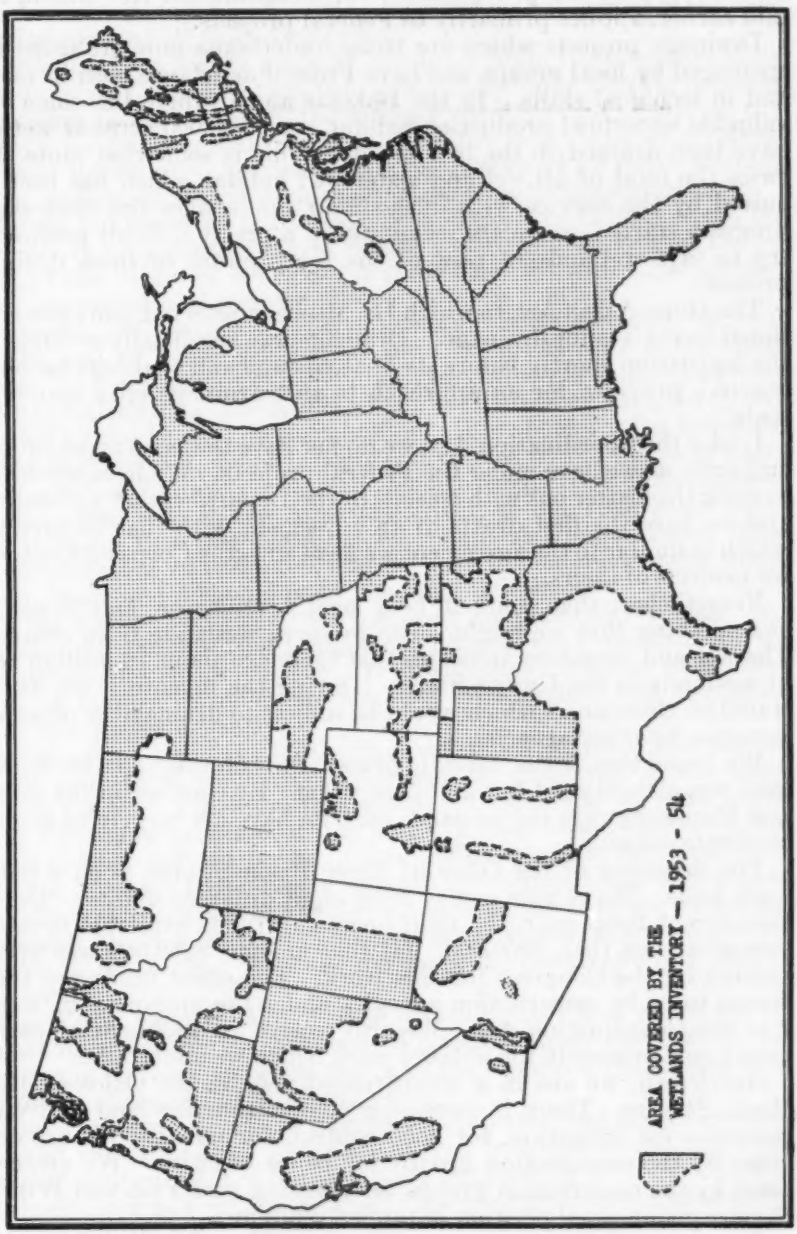
Mr. TOLLEFSON. How long have you had good working relationships with the other agencies like the Corps of Engineers?

Mr. MCBROOM. Well, it has varied. I would not say that we had had bad working relationships with them at any time. I would say that our relationships are much improved by such written documents as you have before you in which everyone agrees that this is the way things ought to be. I think that any tendency toward bad relationships has been the result of misunderstanding, and we feel that this agreement and supplemental papers to it will clear up those misunderstandings.

One of the jobs that we have taken on in the couple of years past is the development of a wetland inventory. Wetlands are disappearing from the country at an accelerated rate because of drainage programs which are being undertaken. Those wetlands are vital to the waterfowl resources of this country. We have not known nor have the State fish and game agencies known of the exact amount of wetlands that we have had in the country and what their value to waterfowl might be.

We have undertaken to develop this wetland inventory and we started it on an accelerated basis at the beginning of fiscal year 1954 and completed the field work at the end of that same fiscal year. We propose to publish the results of that inventory in printed form sometime during the summer.

The inventory attempted to go out and locate every wetland area 40 or more acres in size and to evaluate its utilization for waterfowl and how valuable it was. I believe you have in front of you in that folder also a map which shows the area covered. We tried to cover at least 90 percent of all the wetlands of significant value in this inventory leaving out only those areas which are in arid regions or in high mountainous areas.


U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
AREA COVERED BY THE WETLANDS INVENTORY — 1953 - 54

The results of this inventory, as I say, indicate that wetlands are disappearing at a reasonably rapid rate and that some action must be taken to preserve them. Our activities in this regard are somewhat handicapped by the provisions of the Coordination Act which, as I said earlier, applies primarily to Federal projects.

Drainage projects which are being undertaken now are ostensibly sponsored by local groups and have Federal assistance both in money and in technical skills. In the Dakotas alone, where lies some very valuable waterfowl production habitat, some 500,000 acres of wetland have been drained in the last decade. This is somewhat more than twice the total of all wetland waterfowl habitat which has been acquired by the Service with duck-stamp funds since the duck-stamp program started, so we are seemingly in a pretty difficult position to try to save wetlands in view of the local nature of these drainage projects.

The Hope-Aiken Act, to which Dr. Meehean referred, provides additional incentives for drainage. Drainage was specifically written into the legislation shortly before its final passage and that legislation, as enacted, provides for an approach to this drainage on a watershed scale.

Under the Coordination Act, we do not have the same types of legal authority as we have under the Federal projects. We have attempted to work the matter out with officials of the Department of Agriculture, and we have the first drafts of an agreement with that Department which is similar to the agreement we have with the Corps of Engineers for projects of theirs.

Nevertheless, that seems to be a legal never-never land in getting at something that we might do to preserve wetlands from drainage. The wetland inventory indicates that there are about 76 million acres of wetlands in the United States. During the inventory we concentrated on those areas which would be subject to drainage or other reclamation by other agencies.

We found that in the Atlantic flyway, for example, most of the wetland was classed as of low and poor value. By contrast in the central and Pacific flyways the wetlands that we have are largely of high or moderate value.

The financing of the Office of River Basin Studies is on a patchwork basis. We receive money from eight different sources. During the current fiscal year, the total operating funds available to us are somewhat less than $900,000. Of that amount $263,000 was appropriated by the Congress for this work. The other funds are transferred to us by construction agencies under the authority of section 2 of the Coordination Act. We also receive an allotment of permanent funds primarily for wetland work which we undertake.

Gentlemen, we are in a controversial field in the Office of River Basin Studies. There is increasing competition for land and water resources for irrigation, for flood control, for power. We are criticized by the construction groups for being negative. We are criticized by the construction groups for insisting that Fish and Wildlife Service get an equal position in project planning.

As you may imagine, the most difficult problem that we face is where our studies show that the damages to wildlife and the costs of mitigating them will tip a project over from the feasible to the infeasible,

that is, where the wildlife analysis is decisive in dropping a project benefit-cost ratio to a point less than unity.

In some quarters there is a tendency to dismiss fish and wildlife resources as of little account, as just something that a few esthetic people are interested in, but which have no solid value; but fishing is the most popular sport of all recreation types.

According to a survey made by the Iowa State Conservation Commission for the whole Nation, fishing and hunting is also big business. According to their figures, the amount spent by the people of this country for hunting and fishing is twice the retail sales of all drugstores in the country, four times the retail sales of all men's clothing stores, and equals the retail sales of all gasoline filling stations.

We are not prepared to back up those figures nor to deny them, but we do have an economic survey which we are undertaking at the request of the States in which we hope to come up with some answers which we might well support.

I would like now to refer to the map, which you have in your folders, and to a few selected studies of the Office of River Basin Studies. I can start with the Nimbus Dam, which is on the American River in California. The Nimbus Dam is an afterbay dam, being constructed by the Bureau of Reclamation. It is about 7 miles below the higher dam above it, which is being constructed by the Corps of Engineers. In that 7 miles is contained about three-quarters of the remaining spawning area in the American River, so our river-basin study recommended that there be a hatchery built at Nimbus Dam. That recommendation was adopted, and we have the hatchery today under construction, and it should be finished by this fall.

In the Pacific Northwest, our problems are particularly acute. As has been pointed out, that is the No. 1 stream, the Columbia, for the production of anadromous fish. It already has a number of barriers on it. A number of others are planned. We are told that the region needs new power urgently.

At the same time, if all the proposed dams that are now on the boards were to be constructed, it would be disastrous to the anadromous fishery. There are things that we can do as we have in the lower Columbia program, which you will hear about tomorrow, but it looks rather difficult for us to save that resource in that area.

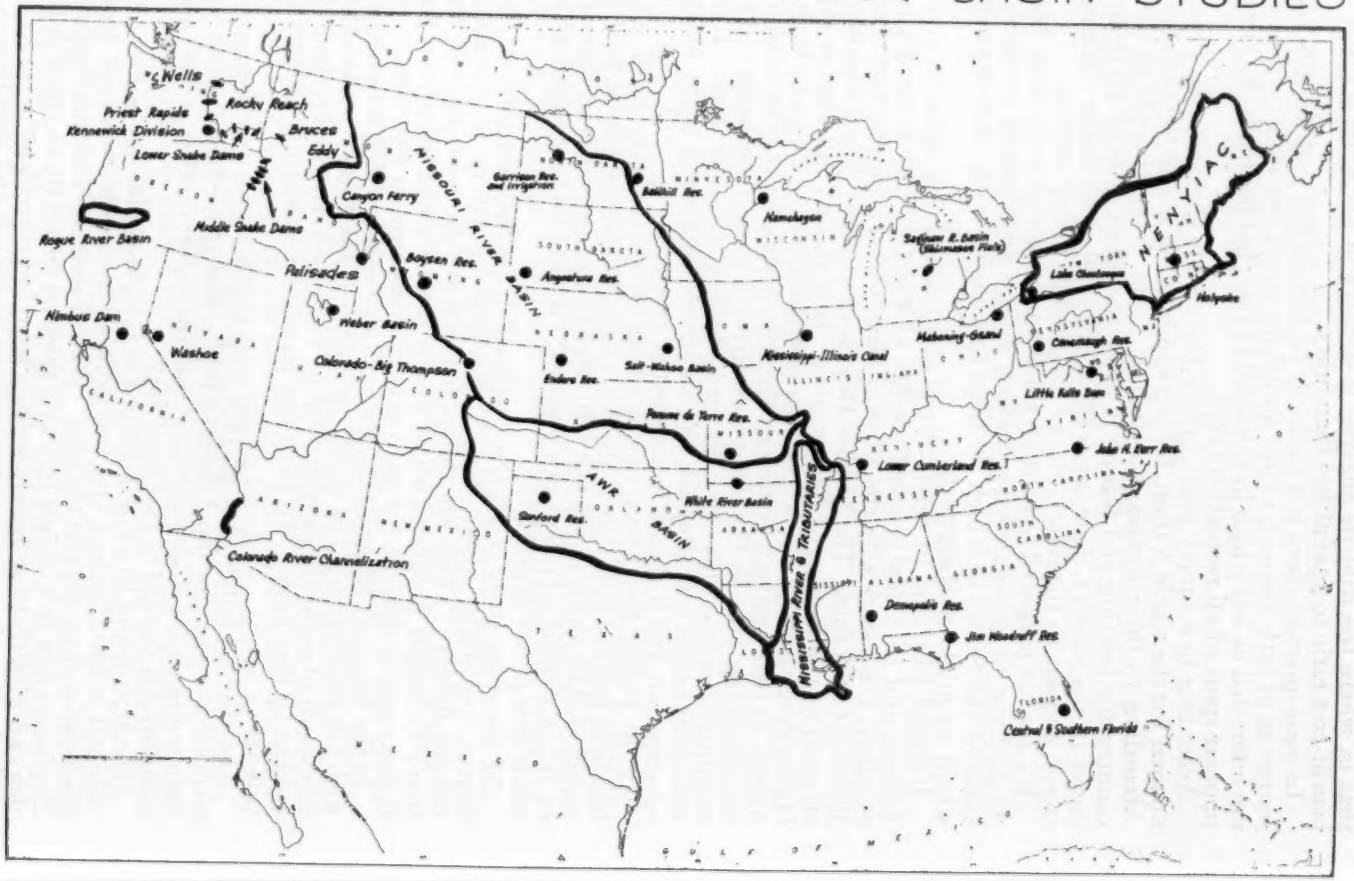
In the Missouri River Basin, we have a program which is combined with the total program of the Department of the Interior to develop an overall plan for the development of water resources and related resources in that area. We have our largest concentration of staff in this area.

The Flood Control Act of 1950 directed the Chief of Engineers to develop a plan for the Arkansas-White-Red River Basin which has been going on for some years now, and the report on that is due to be completed at the end of this fiscal year.

The Mississippi River and tributaries is an area that has tremendous fish and wildlife values and has suffered tremendous damage from the flood-control work in the area. We are working with the Corps of Engineers now in a review in which they are currently engaged to get fish and wildlife more closely written into the project plan.

We have another interagency study in New York and New England, including New York and all other States to the northeast. That was

SELECTED STUDIES -- OFFICE OF RIVER BASIN STUDIES



also authorized by the Flood Control Act of 1950 and will come out in about 40 volumes on 28 river basins in that area. We have been engaged very closely in that.

Gentlemen, I am afraid that I have taken more than my allotted time. That is the picture of our river-basin studies as we now see it.

The CHAIRMAN. Thank you very much, sir.

Are there any questions?

Mr. TOLLEFSON. I have a question.

The CHAIRMAN. Mr. Tollefson.

Mr. TOLLEFSON. A few years ago, I saw some data on the anticipated effect of new dams on the Columbia upon the fish life. As I recall the figure there for each dam proposed to be built, for instance on the Snake, a certain percentage of fish population would be lost. Do you remember any such study being made?

Mr. MCBROOM. I do not have personal knowledge of that, but I do know that for each dam which is built on that system there will be a delay in the upstream migration of the adults to their spawning area. The cumulative effect of that delay is likely to be very harmful.

Mr. TOLLEFSON. Would you say that if the dams that are marked on your map are built that 50 percent of the salmon run would be destroyed, just picking a figure out of the air?

Mr. MCBROOM. I would say that that is about it.

Mr. TOLLEFSON. Do you have any figures on the value of the salmon running up the Columbia to spawn?

Mr. MCBROOM. Well, the Service has estimated that the value is about $17 million.

Mr. TOLLEFSON. That is per year?

Mr. MCBROOM. That is right.

Mr. TOLLEFSON. Is the department giving constant study to the problems created by the construction of dams?

Mr. MCBROOM. Yes, sir, particularly in the Pacific Northwest the department is highly concerned with the problem at that point.

Mr. TOLLEFSON. Have they come up with any new fishery devices in recent years like improved ladders or improved methods of letting the fingerlings come downstream?

Mr. MCBROOM. Not that I can mention, specifically. However, there is a research program. It is very active in that field now. And our information is that the results look promising, that the progress looks promising to find some kind of an answer in the not too distant future.

Mr. TOLLEFSON. There always has been some talk, of course, that fish hatcheries might do the job artificially that was done naturally before the dams were built. What has been your experience with the hatcheries, as far as spawning of salmon is concerned?

Mr. MCBROOM. Well, the hatcheries in the lower Columbia River program, which will be described for you tomorrow, I believe, have been very successful along with other means in maintaining runs of fish in the lower Columbia, that is, below McNary Dam.

Mr. TOLLEFSON. That will be discussed by somebody else?

Mr. MCBROOM. Yes, sir.

The CHAIRMAN. Mr. Robeson?

Mr. ROBESON. Is someone going to tell us how to supplement the feed of these wildfowl in all these areas to which they migrate? I am

thinking particularly of the lowlands and the marsh areas. So the food supply being diminished?

The CHAIRMAN. We have been through the first 2 days with migratory birds. This section is on fish. If there is anyone whom you wish to call back on migratory birds, we can make arrangements.

Mr. ROBESON. He mentioned the drainage. I know there is a lot of drainage on all these areas, and I presume that if these wetlands are drained out where there was natural food the food would be diminished.

Dr. MEEHAN. Mr. Chairman, along the gulf coast there has been a considerable loss of habitat due partly to the canals which have been built down there with the intrusion of salt water, as a result of the inland waterway, and also because of the oil wells and other types of activities in that area. It has reduced the waterfowl habitat considerably during the winter season.

As a result there has been some indication in very recent years that many of these waterfowl are staying much farther north and it begins to appear that it may be necessary to improve habitat in Oklahoma, Nebraska, Kansas, and through that area, for overwintering purposes. And the States are taking steps in the land acquisition programs for that purpose.

Mr. ROBESON. That is along the line of what I was thinking as to where there may be areas which do not now have much food but which might be supplemented. I wondered if that came under your jurisdiction.

Mr. MCBROOM. The Office of River Basin Studies would attempt to recommend compensatory measures for both wildlife and fish.

Mr. ROBESON. Do they do it?

Mr. MCBROOM. We can recommend it.

Mr. ROBESON. Have you been doing it?

Mr. MCBROOM. Yes, sir.

Mr. ROBESON. That is all.

Mr. ALLEN. Mr. Chairman?

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. I am curious to know what you do with regard to following up the recommendations that you make and testing the results. Do you have a program of testing whether or not the recommendations you have made and which have been carried out produce the results which you expect?

Mr. MCBROOM. Yes, sir; we have a small staff in each of the regional offices, and they are under instructions to follow up the projects after they are constructed and determine as best they can the effects of both the projects and the recommendations we have made.

Mr. ALLEN. Has there been any publication of the nature of their findings?

Mr. MCBROOM. No; there has not been publication. You have in your folder a pamphlet on river basin studies which describes generally the measures which have been installed but does not give in one place the evaluation of it.

Mr. ALLEN. I understand that sometimes the interposition of a large body of water, such as Shasta Dam and the water behind it, would create a different climate in the water which would make the habitat for the original type of fish unsuitable for continuance of that particular type of fish. I was wondering whether you restock a lake

like that with some other species of fish or endeavor to develop a resource to replace one rather than to continue a resource?

Mr. McBroom. That is right, Mr. Allen. We have done exactly that in connection with the Table Rock Dam, which is now under construction in Missouri and over which there has been quite a little controversy.

The water which comes from Table Rock Dam will be cold; whereas, the water in the past has been warm, so that the species will change and it probably will need some sort of restocking of a different species to sustain the recreational values which are high in the area.

Mr. Allen. Is that part of your responsibility?

Mr. McBroom. Our responsibility is to make the recommendations. The responsibility for constructon of these matters and the operation of the various things such as wildlife management areas lies elsewhere in the Fish and Wildlife Service.

Mr. Allen. Thank you.

Mr. Pelly. Mr. Chairman?

The Chairman. Mr. Pelly.

Mr. Pelly. I would like to ask if the mortality rate on the fry going downstream in these rivers is very high going through the generators or whether you could give me any figure or not as to the estimate of the loss on the going out to sea of the salmon.

Mr. McBroom. That is a very difficult figure to compute because the basic data that you need to find out the percent of loss is a rather tenuous thing. You have to estimate somehow how many fingerlings are coming down. It cannot be done with regular fish-counting devices. You have to find out how many are on the opposite sides of the dam. The Service has made some attempts to develop information of that character in connection with the Bonneville Dam on the Columbia River and the results show that the mortality is heavy. I cannot give you the exact figure.

Mr. Pelly. I do not think that there is going to be any stopping of the power program on the river and it will eventually be one dam after the other. That means that the mortality if it is fairly high will be increased with every dam, certainly, from the higher spawning grounds.

The thought that comes to my mind is: Is there any program recognizing the power projects that are contemplated to offset that in some way by hatcheries which would mainain something of the number of salmon that have heretofore been on such a river as the Columbia?

Mr. McBroom. Yes, sir; the hatcheries have been established and have provided considerable success on the lower Columbia program, as will be described tomorrow.

Mr. Pelly. That program will be discussed tomorrow?

Mr. McBroom. Yes. Our white hope is on this research program to get fingerlings downstream.

Dr. Meehean. Dr. Walford, who testified I think before you yesterday, has charge of a research program on the west coast that is intended to attempt to get those young fingerlings down the stream safely. I think he probably mentioned the use of lights, electricity, and a number of other things to guide the fingerlings to devices that would carry them over the dam without doing damage and to prevent them from going through the turbines.

On the low dams many of the fingerlings go through the turbines successfully because they are slow-speed turbines. As the dam gets higher, the turbines increase their speed and the damage is much greater.

Mr. PELLY. Have you any view as to whether or not it is possible by developing more and more hatcheries to compensate the fishing interests for their valuable investment and number of jobs, and could we hope to preserve the great resource based on what experience you have so far?

Dr. MEEHEAN. We have the feeling that we can preserve a very sizable portion of the resource. Hatcheries are successful in certain instances. Those in the lower Columbia River have been particularly successful. By the use of devices that are being developed now through the research program and also the improvement in fishways, abating stream and other types of devices, so that the fish can get over the dam, and also by pollution, by improvement of habital and stream clearance, and similar types of activities, we feel we will save a very sizable proportion of the fish that are there now, but the research will have to go hand in hand along with the construction.

Mr. PELLY. I think that is the basic inquiry I had, and if it is going to be discussed tomorrow, I will not pursue it any further.

The CHAIRMAN. Mr. Miller?

Mr. MILLER. Fingerlings that go through these turbines, do they live a normal life, do you know, or does it have some permanent effect on them? Have they ever been able to determine that definitely? I think that that was one of the questions in the beginning.

Mr. MCBROOM. As far as we know, if they get through the turbine and survive, they will be all right.

Dr. MEEHEAN. There have been experiments in putting them through devices where the pressure change is rapid, and it has been found that salmon, of all of the species of fish that we have, are able to change their adjustment to pressure more quickly than any other fish. By putting them in pressure tubes and releasing them suddenly, we have found that salmon are able to make that adjustment where other species are not.

These experiments were conducted in connection with the problem where the city of Takoma plans on building some high dams, and we are faced with that problem of getting them down through the pressure tubes.

The CHAIRMAN. Are there any other questions?

Thank you very much, sir.

Mr. MCBROOM. Thank you, Mr. Chairman.

The CHAIRMAN. I understand that you have supervision of all hatcheries?

Mr. MCBROOM. No, sir; we have supervision only of the personnel engaged in the studies in connection with these projects.

The CHAIRMAN. With hatcheries?

Mr. MCBROOM. We have no supervision over any hatchery in the Office of River Basin Studies.

The CHAIRMAN. Do you have just the research?

Mr. MCBROOM. Not the research, just the study of the other projects by other agencies.

Dr. MEEHEAN. Mr. Chairman, the man who has charge of the hatchery program will be here tomorrow to talk to you.

I would like to introduce to you now Mr. Bob Rutherford, who has charge of the Federal aid to wildlife and fisheries. These service activities are of relatively recent origin, comparatively speaking.

They are of special importance because they touch on every State organization and every State program and in many cases they help the States to shape up their fish and wildlife programs. As a matter of fact, Federal aid has been the backbone to many State programs over the years. They have had a big influence on developing technicians, or developing administrators, and other people, for State and Federal organizations.

The information and the experience resulting from the programs that have been developed in this sphere of activities have had a great influence on the type of programs that the States, and in some cases the Service also, have been able to carry on. It has placed the management of those resources on a much sounder basis throughout the country.

The CHAIRMAN. How long has this river basin study been in effect?

Dr. MEEHEAN. Since about 1946.

STATEMENTS OF ROBERT M. RUTHERFORD, CHIEF, BRANCH OF FEDERAL AID; AND JOHN L. FARLEY, DIRECTOR, FISH AND WILDLIFE SERVICE—Resumed

The CHAIRMAN. Would you give your full name and background?

Mr. RUTHERFORD. My name is Robert M. Rutherford, Chief, Branch of Federal Aid, of the Fish and Wildlife Service. I am a graduate of the University of California where I received a B. S. degree in forestry.

I started with the biological survey, one of the predecessors to the Fish and Wildlife Service in 1926 as a junior forester, working on the establishment of the first acquired national wildlife and fish refuge in the United States, the Upper Mississippi River Wildlife and Fish Refuge.

When the Migratory Bird Conservation Act was enacted in 1929, I was transferred to that work on the establishment of the national system of migratory waterfowl refuges. After the enactment of the Pittman-Robertson Federal Aid in Wildlife Restoration Act in 1937, I helped get that organized and served as Assistant Chief of that branch until 1942, when I was made Chief of the Federal Aid Branch of the Fish and Wildlife Service.

The Dingell-Johnson Federal Aid in Fish Restoration Act was passed in 1950, and that was added to the work of the Federal Aid Branch.

Both of these Federal aid acts, the Federal Aid in Wildlife Restoration Act, and the Federal Aid in Fish Restoration Act, are financed by excise taxes. The one on the wildlife side is financed by the 11 percent excise tax on sporting arms and ammunition which is paid by the manufacturers of those products. The collections from that tax are appropriated by the Congress and are allotted to the States in harmony with the apportionment formula in the law.

The States select the work. They carry it out with their own personnel and are entitled to receive reimbursement for 75 percent of the costs that they incur in carrying out that work.

Our responsibilities are confined to passing upon whether State project proposals are substantial in character and design under the law, and whether the work has been satisfactorily performed before we approve reimbursement claims from the State for 75 percent of the costs.

Now, the same operational procedure applies under the Fish Restoration Act.

The CHAIRMAN. What are these projects? Would you name them?

Mr. RUTHERFORD. Yes, I will get into that, Mr. Chairman.

The CHAIRMAN. Excuse me, sir.

Mr. RUTHERFORD. When the Pittman-Robertson Federal aid in Wildlife Restoration Act was passed in 1937 and prior thereto two sponsors of it predicted that it would turn out to be the outstanding piece of wildlife legislation enacted by the Congress since the Migratory Bird Treaty Act in 1918, and I think that their predictions were well founded.

In the publication Five Years of Pittman-Robertson Wildlife Restoration, copies of which have been distributed, we shape that up. We have in here in the way of what might amount to a foreword, the reproduction of a letter from Dr. Gabrielson, president of the Wildlife Management Institute, to Director Farley of the Service, and in that letter Dr. Gabrielson, in the second paragraph, stated:

> There is no doubt about it: P-R has become the backbone—or, perhaps more correctly, the spinal column—of our States' wildlife programs. Under P-R, staffs of technically trained wildlife workers have been assembled, new skills developed, and the management of wildlife has taken on new meanings. The interesting and important developments concerning the birds and mammals discussed in this 5-year report give some indication of the many accomplishments already made in this well-managed program.

When the program started in 1937 there were not more than 5 States that had a single technically trained wildlife worker in their employ. I made a hasty estimate the other day and figured that there are at least 700 at the present time working on Pittman-Robertson wildlife restoration projects.

The CHAIRMAN. Do you remember the States?

Mr. RUTHERFORD. To the best of my recollection, Mr. Chairman, the States at that time were New York, Pennsylvania, Michigan, Minnesota, and California. Inasmuch as the States have not had the benefit of the technical approach to wildlife restoration and management prior to the enactment of this particular law, that is practically all of them, initially they emphasized the wildlife research procedures and approximately half of the money went into wildlife management fact-finding work.

I recall, for example, that Colorado was feeding deer. They had overpopulation problems. They were feeding the deer. Well, a short study by these newly employed wildlife technicians turned up the fact that the deer were dying with their bellies full of good alfalfa hay. So the State quit feeding deer and saved themselves $50,000 a year and started to manage those deer, taking off the numbers that the habitat would not support, hunting them off.

The Western States in particular have worked out procedures for setting seasons and bag limits on their deer, and elk, too, for that matter, whereby they set their regulation on a watershed basis. They have found by tagging the animals when they catch them in the win-

tertime and catch fawns out on the fawning ground, they have found that there is very little movement between watersheds; that they are pretty well confined a lifetime to a particular watershed. Consequently, it is practical to set the seasons, 1 animal or 2 animals to a watershed, and they will have no impact elsewhere. That is quite an improvement on the old days where hunting seasons were statewide and where you could not put on the pressure or reduce the pressure in accordance with the status of the population.

New York technicians came up with a method of aging deer according to the development and wear on their teeth. That is valuable because if you find that the hunters are bringing in older age animals the question is what happened to the young ones, and it could be starvation; it could be predation, and it could be several things. It points to a problem and then they can go out and investigate the problem.

New York also came up with studies and findings that permit the technicians, by examining the organs of doe deer, tell whether they have reproduced, whether they were bred and thereby add another clue to use in their management work.

For example, I remember one case where the laboratory worker came up with the conclusion that in a certain district of the State poaching must be unduly high because the deer that he was examining in the laboratory were in good shape, the adult does were producing their normal quota of two fawns and yet the population was not going up notwithstanding the fact that hunting pressure had not increased particularly, and there was no particular amount of predation, and the range was in good shape. So the only answer was poaching and that was the answer.

Missouri technicians worked out a chemical test so that they can identify cooked vension even though it is in a sausage and mixed with other meats. That is a very valuable thing for law enforcement.

The CHAIRMAN. Do you mean that you tell the difference in the meat of the doe and buck deer?

Mr. RUTHERFORD. No, the difference between venison and pork or beef in a sausage.

The CHAIRMAN. Is it possible to tell the difference in the flesh of a doe deer and a buck deer?

Mr. RUTHERFORD. No; no more than between a steer and a cow.

The CHAIRMAN. There was a game warden in my State who was convicted on testimony of that kind that they told the difference between the doe deer and the buck deer.

Mr. RUTHERFORD. He might have gotten hold of the carcass and could tell by the organs.

The CHAIRMAN. It was just a quarter of the deer. I did not mean to interrupt you.

Mr. RUTHERFORD. I never heard of that Mr. Chairman. I touch heavily on deer because they are our major big game animal. There are about 10 million deer in the United States, white-tailed, black-tailed, and mule, compared to the next highest in the big-game line which would be about 350,000 elk and about an equal number of antelope.

With the upland game birds the techniques had to be worked out. Technicians worked out techniques for pheasants. They found that

they could make the sex ratio counts during the winter when the birds are concentrated and, of course, it is easy to tell between a hen and a cock pheasant. Then, in the early year when they are breeding they can go to selected areas and listen to the crow counts of the cockbirds. They already know what the sex ratio is. They can count the crowing of these cockbirds and determine the number of nesting hens in those sample areas, and bring that statewide across the board.

Then in the summertime when the young are past the most vulnerable stage, they ride the roads and get the brood counts to find out what the success is of the nesting and from the brood counts they can tell whether there has been an increase or decrease in the population over the previous year, and thereby can make firm recommendations to the game commissions as to whether the hunting regulations should be tightened up or liberalized.

The CHAIRMAN. Who is doing all of this?

Mr. RUTHERFORD. The States are doing it on these Pittman-Robertson projects.

The CHAIRMAN. Do you mean all the States?

Mr. RUTHERFORD. Not all of them, but for instance in the pheasant range the States are using these practices pretty generally.

The CHAIRMAN. You are talking about pheasants now?

Mr. RUTHERFORD. Yes, sir. I would say about 95 percent at least of the wildlife research conducted by the States in the country is being financed by Pittman-Robertson funds.

The CHAIRMAN. What about the quail population?

Mr. RUTHERFORD. Of course, they inventory those, also, as a part of the techniques and make recommendations to the game departments regarding what the seasons and bag limits should be, but in the Southeast, Mr. Chairman, the emphasis down there has been on habitat improvement work, field border plantings of the perennial lespedeza to provide food and cover for quail and for other practices that would help those farmland birds and woodland birds, too, for that matter. As you know, there are considerable populations of quail in the woods if conditions are at all right for them and it is not too much overgrown.

The CHAIRMAN. What study is being made, if any, to determine how much damage these insecticides being used for agricultural purposes are doing to kill quail and that type of bird at the present time?

Mr. RUTHERFORD. Well, they are studying that. There is not, of course, very much they can do about it because the farmer is king on his own domain. I think the damage probably is particularly heavy where they use these herbicides to kill off vegetation that could be valuable as cover for the birds.

The CHAIRMAN. Spraying underneath powerlines and telephone lines kills everything.

Mr. RUTHERFORD. As a matter of fact, some of the States have worked out deals with the power companies whereby they will plant this lespedeza and other food crops along the powerlines and that prevents trees from coming in and growing up and getting in the way of the powerlines, which is the major concern of the power companies. If they can get something growing low and maintain it low they are perfectly content.

The CHAIRMAN. Is any study being made to eliminate from the insecticides the ingredients that kill the birds and still leave the ingredient that kills the bugs and worms?

Mr. RUTHERFORD. No, there is not.

The CHAIRMAN. Chemistry and science are now able to do so much that I am not surprised at anything. I was wondering whether any study along this line is being made.

Mr. RUTHERFORD. They have studied it and do have conclusions, but there is not much that they can do about it.

Another thing that would knock it out for the young birds is that, as you know, the younger birds eat insects almost exclusively to begin with and where you use DDT and knock off the insect population they have nothing to eat and with the loss of that food supply they can very well perish.

The States, under Pittman-Robertson, have emphasized land acquisition. In fact, they have purchased about a million and a half acres of lands for various purposes. Three-quarters of a million acres of that, approximately, has gone for the acquisition of big game refuges in the western part of the country. Out there, of course, the ranches have taken up what formerly was deer and elk wintering grounds, and especially the elk, because they are competitive with livestock and if the States are going to hold reasonably high population of elk for their hunters, they have to have the lands on which to feed them. After all, those elk have pretty robust appetites and the ranchers, after they put up their hay, do not take kindly to the elk coming down in large numbers and free-loading on them. So the States generally have bought elk winter ranges.

A good example of that is in Montana where the Montana Game Commission has purchased about 20,000 acres at the upper reaches of the Sun River to provide winter range for some 3,000 elk that come down into that country every winter. That 3,000 elk will provide about 750 animals for the hunters every fall. They figure about a 25-percent take on elk. So, with the 3,000 population, they can figure on taking off 750 elk.

That is the second-largest population of elk in Montana and it is being managed on a sustained-yield basis.

The waterfowl have been given quite a bit of attention on this Pittman-Robertson program. In fact, the States collectively have purchased a half million acres of lands for waterfowl. They have performed developmental work on 1½ million acres to benefit waterfowl.

The very first project to be approved on this Pittman-Robertson program in 1938 was submitted by the State of Utah for the establishment of the Ogden Bay waterfowl refuge and public shooting ground on 6,000 acres on those gently sloping mud flats bordering a great salt lake where the Ogden and Weber Rivers flow into the lake. The State erected dikes and has been managing those lands for refuge and hunting, and it is a nesting area for both ducks and geese, too.

Of course, the biggest one that any State has pushed to completion on the Pittman-Robertson program for waterfowl has been the Roseau area in Minnesota, 54,000 acres. That is right up against the Canadian line. As a matter of fact, it is unique inasmuch as you have an international overlay on this with the Boundary Commission approving the diversion of water from a Manitoba stream into Minnesota to this waterfowl area, and where the Minnesota Conservation Department contracted with its counterpart in Manitoba for Manitoba to dig this ditch across Manitoba territory to Minnesota and for Manitoba

to put in a plug in that particular creek which provides a major water supply for this Roseau waterfowl area. It is an excellent area and represents about a million dollars expenditure of Federal and State funds on this Pittman-Robertson program.

New York has gone into some fair-sized waterfowl units, but they have in recent years emphasized the little fellows that run from anywhere from 2 to 10 acres of little marshes for breeding purposes, to put more birds into the flyway. They have a thousand or 1,500 of those scattered around the State now, and are continuing that program.

Indicative of the keen interest of the States in waterfowl, is the fact that on their Pittman-Robertson projects to date they have invested about $30 million. That represents about 25 percent of the total expenditures by the States on this program.

In parts of the country where winter cover is deficient such as in the Dakotas and Nebraska particularly, the States have gone into the planting of trees, shrubs, and herbaceous vegetation to give their birds and particularly the ring-necked pheasant some winter cover. The lack of that has caused very big die-offs in the past and the State naturally wants to retain sufficient numbers of those birds to provide a breeding population for each spring of the year.

South Dakota was the first one to embark on this program. They are establishing four of these cover developments per township. That is a township of 36 square miles. Those are usually at the farmsteads. They are 300 feet wide and may be anywhere up to within an eighth or more of a mile long on the northwest side of the buildings where the farmer gets the benefit from their action on reducing the prevailing winds which come from the northwest in the winter. They are working very well in saving the pheasant population.

Of course, the farmers are interested in them because in that treeless country a little landscaping like this certainly helps.

I recall that one of them told me this: He figured this cover development was worth several thousand dollars to his farm. The State furnishes the planting stock and plants it. The farmer plows the land and puts up a 3- or 4-strand barbed-wire installation and cultivates it, indicating that farmer is interested.

Trapping and transplanting when this program began was given considerable attention by a number of the States. Very excellent example of a successful endeavor has been down here in Virginia where they brought in about 1,500 white-tailed deer from Pennsylvania, Michigan, and Wisconsin, and stocked them in the western part of the State where they had none. They started that in 1939 and over a period of years stocked about 1,500 deer. Last year the hunting take was about 8,000 and their population is going up in the western part of the State. That is considered the outstanding accomplishment in wildlife restoration of the Virginia Commission of Game and Inland Fishery in its long and profitable history.

Colorado had its first bighorn sheep hunt in 50 years last year and that was accomplished by trapping and transplanting from a residual supply of those sheep into habitat that was suitable for the sheep, but from which they had been killed out years before. That State also credited its Pittman-Robertson program with the fact that it held its first wild turkey open season in 1949, the first one in 56 years. The hunters took 1,000 turkeys in a limited hunt.

Mr. MILLER. The chairman asked about quail. Why don't you tell him about the gallinaceous guzzlers. They are western quail.

Mr. RUTHERFORD. I am glad you mentioned that because studies in that work were begun when Mr. Miller was in charge of the fish and game work in California a number of years ago.

To start with, one of the technicians out in the field saw a quail going into a ground squirrel hole. He checked and found out that they were going in for water. He thought maybe we could build an underground storage tank for water and the quail would go there and drink water. So they played around with different devices and finally came up with a concrete apron with creosote on top so that the cracks would fill up, and a concrete underground storage tank where the bird could go down a ramp into this water storage tank and get water. The rainfall on the concrete apron flows down into the underground concrete storage tank and the birds go in there and get a drink. They support several hundred Valley and Gambel's quail in places where they had none previously because water was the limiting factor.

It has been a very successful installation in California.

Mr. TOLLEFSON. Do they use it elsewhere?

Mr. RUTHERFORD. All the Western States are using it, Arizona, New Mexico, Utah, Nevada; even Washington in the eastern part around Spokane have not made the underground ones, but they have watering installations there. They have either improved springs or sometimes have made these apron effects to collect the water and flow it into a storage tank where the birds and particularly pheasants and Hungarian partridges can get water.

Before I go on the fish side of the Federal aid in fish and wildlife restoration, are there any questions on wildlife?

The CHAIRMAN. Are there any questions?

Mr. MILLER. Mr. Chairman, I would like to make this observation about the people who do this work in the field. These young biologists go out, and ichthyologists in the case of the fisheries people, and parasitologists, and they are dedicated people. I have seen them following game out on the desert. I have seen them up in the river basin living under conditions under which no man wants to live, counting fish and getting the data on which the project increases in game, living catch as catch can. I want to tell you that they are dedicated people and I think that we owe them a great deal of gratitude.

They do work that frankly is like all work in the field of biology, work that requires intense concentration. It is not a matter of money. It is just that they become so intensely interested in that work that they carry through because of the love of the work that they are doing.

I think they are a great bunch of people, and I would like to pay them a compliment here.

The CHAIRMAN. I am glad that the record will show your compliment. All of us are interested. We want to do something and play our part in this so as to perpetuate the fowl and game for generations that come on.

Without the work of the people that you have mentioned, and the gentlemen who are testifying here today, in a generation or so we would not have the beauties that God Almighty has put on this earth in wildfowl.

Mr. MILLER. The trouble with a lot of people who are very practical in these fields and who think they know a great deal about them is that they are highly critical because they do not understand the technical research and the data which have to be accumulated to base the projects and to pay off.

A good many of the projects described here are pioneer projects in these fields. A lot of them have not paid off, but out of it some little thing comes which you can tie to; in the life of development of fish and game it is merely a moment, but great strides in other things may be made.

You mentioned the strides made in chemistry. If we preserve the wildlife for tomorrow these are the people who are the pioneers. Some of the men who appeared here are the pioneers and deserve the gratitude of the people of the Nation who are interested in that subject.

Mr. RUTHERFORD. Now, as to the Dingell-Johnson Federal aid in fish restoration program of 1950, when that started off on July 1, 1951, unlike the situation which prevailed when the Pittman-Robertson work started in 1938, practically all of the States had at least one technically trained fishworker in their employ.

I think that perhaps the demonstration of the good that came out of employing technicians on the wildlife side had some influence in some of the States in causing the people to hire technically trained fishworkers.

This program is now in its fourth year and the States are spending about 50 percent of their apportionments for fish research. The activities being carried on are principally two from the factfinding standpoint. One is the general type of survey of State waters to acquire information about the physical, chemical, and biological properties of the waters, the kinds of fish in them, and the relative abundance of those fish.

The other study is more of a specialized study on individual waters and this study or such studies being particularly concerned with individual species and emphasizing the hatchery fish aspect.

Now, the big bulk of the fishing license dollar in the United States is going into the production and the distribution of hatchery fish and some of the States, or a considerable number of them for that matter, are emphasizing studies to ascertain the survival of hatchery fish and the contribution of those fish to the fishermen's creel.

For example, before this Dingell-Johnson program started the fish work in Montana consisted of hatchery operations, production and distribution of hatchery fish, and the enforcement of fishing regulations. One of their first studies was to ascertain how effective some of their hatchery distribution was and they found that in streams where they had been stocking brown trout the anglers were catching mostly rainbows. So they quit stocking brown trout and went to stocking rainbow trout in order to increase the number of fish that the anglers would get.

Colorado, in its high mountain lakes, has situations that are not conducive to spawning. The question is what size fish shall we plant? So they tried out eggs, fry, fingerling, and legal-size fish and came up with the conclusion that the best dividends would come out of stocking fingerlings.

In your own State of North Carolina, Mr. Chairman, the fish and game department has been conducting studies in the mountains to ascertain on those trout streams when the best time was to stock trout, and they tried it different times of the year and different sizes, and finally came up with the conclusion that the best time to stock trout was during the legal fishing zone and to stock them as legal-sized fish so that the anglers could take them out; that the best time to do it was then, just straight put and take.

In California they conducted a study of the catfish fishery in the Sacramento River delta country at San Francisco Bay, and found that the catfish was being overutilized so they put a stop to commercial fishing for catfish and confined it entirely to sport fishing.

California has also been conducting research in marine waters. There is more justification for that in California than in any other State because in California you must buy a fishing license to fish in coastal and tidal waters, and a lot of revenue comes to the fish and game department from licenses bought by those who go out in fishing boats and those who charter fishing boats.

California has been conducting one study on the yellowtail, a popular fish in southern waters. They do not know much about that fish and are tagging them in large numbers to ascertain what their migrations are so that they can chart that and figure what they might do in the way of improving management. They do not know where they spawn or how fast they grow. They are gaining information on those operations.

Along with the tagging of the yellowtails they tag some albacore, a member of the tuna group. They are very popular with the sport fisherman, also, although they are pretty much commercial. One of these albacore which they tagged off the coast of California was fished out 500 miles from Tokyo later. Two of those albacore were fished up near Midway, halfway across the Pacific, 6 months after tagging in California, so apparently they have a great range of migration.

On the east coast the States have banded together and are making a study on striped bass.

The CHAIRMAN. Did the other witness speak of authority with respect to these multiple dams?

Over here in Virginia the dam on Buggs Island in the Roanoke River flows down through North Carolina and there is quite an agitation now in that part of Roanoke around what is known as the town of Weldon where the striped bass came up and spawned. In the rocky area there is not enough water going down the Roanoke from this multiple dam to permit the bass to come to this area now.

Do you have any control in the erection of these dams in order to let off sufficient water to supply the fishing ground of that nature?

Mr. RUTHERFORD. No, sir. We would have no control over that, Mr. Chairman.

The CHAIRMAN. Do you have anything in that agreement to which you referred to control the water in what is known as the Kerr Dam to let a sufficient amount of water just at this time of year? These bass come in from the ocean and cannot get to that spawning ground.

Mr. RUTHERFORD. In many places, of course, the use of water for wildlife is not set up as a beneficial use so you would not have control over it.

The CHAIRMAN. Let me revert to the other witness.

Do you have any influence which you could bring to bear in a case like that wherever it may be?

Mr. MCBROOM. Yes, sir; we have been following that as one of our river-basin studies very closely, Mr. Chairman, on the Roanoke River. The John H. Kerr Dam at Buggs Island was authorized for the purposes of flood control and hydro power. The fish and wildlife conservation was not one of the authorized purposes of that project. We are hopeful that by this agreement on future dams of that character we can have fish and wildlife conservation written in as a project purpose.

As to the Roanoke River and the striped bass situation there, our people together with the State people reached agreement with the Corps of Engineers last year for certain experimental releases from the Buggs Island Dam to provide for the striped bass in the Weldon area.

However, there is another facet of the problem that is rather perplexing at the moment. That is the discharge of pollution into the Roanoke River in the vicinity of Roanoke from the paper mills at that point. So far as we can tell, that pollution is the critical factor in the welfare of the striped bass at the present time.

Mr. MILLER. As a matter of fact, from what you know now it could be the most critical factor, could it not?

Mr. MCBROOM. That is right.

The CHAIRMAN. Do you hold that nature is the best provider for the young fingerlings or that hatcheries are better in the areas of that type?

Mr. RUTHERFORD. If it was boiled to a proposition if nature won't, the hatchery will. I don't know whether you can raise those striped bass in the hatchery. Dr. Meehean is an expert on hatcheries and could tell you that.

Dr. MEEHEAN. The conclusions that we have reached on hatcheries is that they have a specific place in a management program. There is nothing to substitute for nature. That applies to the Columbia River. Under the lower Columbia River program we have been improving habitat there and making more miles of river accessible to the salmon for spawning purposes because you are getting reproduction there for nothing. It does not cost us anything to provide those fish, and nature, if the conditions are right, is very prolific. Hatcheries, as a rule, should only be used as a tool to supplement other needs.

The CHAIRMAN. I am asking because I am interested in California and Alaska and all the areas in this subject. You closed a hatchery in this immediate area that did hatch rockfish or what we call striped bass. Now this condition has arisen there which is known. You closed a hatchery and the condition prevails and it is quite a sport fish, as well as an edible commercial fish?

I am asking you what you are doing. This is not a local matter entirely with the State, as the salmon is not.

Dr. MEEHEAN. The hatchery that we closed did not hatch striped bass.

The CHAIRMAN. It has hatched them in the past. It has hatched shad, and bass, and crappie, and the striped bass, and so forth.

Dr. MEEHEAN. We operated the Weldon hatchery as a substation under the Edenton station. Later on the State of North Carolina

took over the Weldon station and our men helped them to supervise their operations until they were trained and were able to operate the Weldon hatchery themselves.

The CHAIRMAN. I am so sympathetic with all of your work, but it is difficult for me to understand why an established institution which was functioning was closed and you went off and built another one someplace else. I am talking about this rockfish, striped bass.

Go ahead. I will talk to Mr. Farley about that sometime. I tried to keep them from closing this establishment, but they went ahead and closed it. I have tried to be an aid to this whole subject. It was difficult for me to understand.

I have an abiding disposition and go along with those who know more than I know, but I hope that some consideration will be given to the reestablishment of that plant because it did a good deal of beneficial work for that area.

Mr. RUTHERFORD. On this Dingell-Johnson program I have talked a little about the research aspects. Now, coming to land acquisition, of course the States have not gone into big buys for fish work. They have purchased lands on which to impound waters and they have purchased lands to provide public access to lakes and streams. That access work is very valuable because more and more of the shores of the lakes and streams are being taken up by private individuals and unless the States get in and buy some frontage on many of the streams the public will just be kept off entirely.

States like Indiana and Michigan have been acquiring quite a few access sites to lakes.

When I was out West last fall I saw one access site along the Deschutes River in Oregon—about a half mile of stream bank which the State had purchased. I think they paid about $5,000 for it and that gave them access to several miles of the stream where it ran through public lands. It is precipitous country and there is about only one place where you can get in and that is off the highway where they bought this land. It is a beautiful stream for fishing and the public will have access to it.

The CHAIRMAN. I want you, if you will, to touch on a closing of what we call creeks that are adjacent to the rivers for spawning purposes and the extension of the spawning season.

For instance, I know in my State that the department will extend the season for the taking of shad. That means that when the female shad is ripe for spawning it is not the best time as an edible fish and the value of the fish goes down on the edible market, but they extend the season. Then they turn around and want studies made as to why the species is diminishing.

Mr. RUTHERFORD. That is the oddity of some of the ways of regulating wildlife.

The CHAIRMAN. Under these funds you have connection with the State departments, do you?

Mr. RUTHERFORD. Only to the point that they select the work and submit it to us for approval.

The CHAIRMAN. Well, those who hold the purse string have some influence. Is it advantageous to close the stream for the season, we will say, against no taking so as to let the fish get up and spawn?

Mr. RUTHERFORD. That depends, of course, upon the individual stream, Mr. Chairman, and the intensity of the fishery. Of course, fish spawn a lot of eggs. I think a big carp will spawn a million and maybe a good-sized bass 10,000. So a few fish are capable of producing a whale of a lot of young.

I am not personally a trained fish expert. I came in on the wildlife side. I am handling these two lines of work, but my work initially was in wildlife.

The CHAIRMAN. Who handles this phase of it?

Dr. MEEHEAN. I would like to suggest that you hold that question over until tomorrow and talk to Mr. Hagen.

The CHAIRMAN. That is fine. Go ahead.

I want to say that when these hearings are complete, Mr. Farley, that it is my intention to have them printed so that we can distribute them and we can then make a contribution to the effort of you and the other gentlemen in this work. I believe that in that way we will have accomplished quite a lot. That is the reason why I am anxious to have these hearings developed as fully as possible.

If there is material that we have to pass over on account of time that should be put into the record, I would like to have that put in.

Mr. FARLEY. We appreciate the opportunity.

That raises a question which I wish to bring to the attention of the chairman. We have been forced on account of time to leave some subjects out of the discussion. The scheduled program will end tomorrow. Would it be possible to have 1 additional day, sir?

The CHAIRMAN. Yes, sir. I am very much interested in the subject myself and I will be here for an additional day. I cannot be here this week. We will have to end tomorrow, but some day next week we will get in an additional day.

Mr. FARLEY. We will appreciate that very much.

Mr. Chairman, it is necessary that I be away tomorrow. I would like to have the opportunity to express to you and the other members of the committee the real opportunity that we have thought this has given us to present a program that we are very proud of, that we are anxious to make as effective and useful as possible; and we thoroughly enjoyed, of course, the comments of the members of the committee, in some cases complimentary to the work that we have done and the personnel that are engaged in it. We appreciated that particularly, but also have welcomed and can use the friendly questioning that has come into the discussions sometimes pointing out new approaches to these problems which we would like to explore in the hopes that they will result in more effective operations. It has been quite stimulating to us to have this chance to exchange views. It seems to me that it marks the progress in our thinking on these management problems where we had a few moments ago Dr. Meehean commenting on the relative value of spawning as compared to artificial spawning. That comes from a man who has grown up in a hatchery.

Mr. Miller will recall the days in California when we used to justify some of our hatchery program by saying in the hatchery we get 95 to 98 percent of the eggs hatched out into little small fry. That automatically meant that it was so much more successful than letting a fish spawn naturally where maybe she only got 1, 2, or possibly at the optimum 3 percent. So, of course, the hatchery did things that nature could not possibly do.

Then, as the studies have gone on, as Mr. Rutherford pointed out, it developed that some of these young fish raised in hatcheries do not necessarily survive so that the hatchery program may not, even though the count at the planting stage seems encouraging, they may not count that way when they come into the creel. So we have been able to get a new and improved approach on some of those problems.

I have just one other thing, sir. It is my understanding that the artificial propagation has never demonstrated as a profitable venture. It was tried in the early days in California and abandoned because they were unable to determine that it produced fish that were caught later. It was tried more recently here on the east coast and it was my understanding that the same general results came from that; that they were inconclusive as to any effect on the striped bass population. They were able to hatch them and put them in streams, but were unable to demonstrate a return as was demonstrated in the case of trout and so on. I think that was the basic reason why the program was dropped on the east coast.

Mr. RUTHERFORD. I mentioned the acquisition, by the States using this money, of access sites and lakes and streams. The States have also emphasized the development of those access sites by putting in parking areas and minimum sanitary facilities, and where necessary, providing means for the anglers to get their boats on the water safely.

The States last year collectively created 29 lakes by impounding waters. The first project that came in out of Pennsylvania was for the creation of a fishing lake near Pittsburgh known as Virginia Run Lake. It is about 32 acres and, indicating how hungry those people around Pittsburgh are for outdoor recreation, here are three photographs of opening day there when 3,000 Pennsylvanians descended on that 32-acre lake.

Quite often fish get out of balance in lakes or you get trash fish in, that take over. An excellent example of a situation like that was in the splendid 3,000-acre Diamond Lake in Oregon up in the Cascades where initially or originally there were no fish in that lake, but they stocked rainbow trout there along about 1930 and it became one of the best rainbow trout fishing lakes in the State of Oregon.

Someone is always trying to improve. Some anglers brought in some Klamath roaches, a little trash fish, for live bait, and in due time the roach took over the lake and excluded the rainbow trout.

Last fall the Oregon Game Commission conducted the largest poisoning operation using rotenone in the history of that chemical. They poisoned this 3,000-acre lake in one swoop using 200,000 pounds, 100 tons, of rotenone to kill out the Klamath roach. Apparently the effort was a success.

Incidentally, I don't think they found more than a dozen rainbow trout left in that 3,000-acre lake. Now, they will restock it with rainbow trout and start over and if they can keep people from bringing in trash fish they will be able to keep an excellent fishing lake going.

Other States have gone into the poisoning of trash fish. Washington has been buying rotenone for years by shipload. It comes from a tropical plant and is very effective in killing undesirable fish.

There have been quite a number of combination projects—wildlife and fish projects—on the Dingell-Johnson and Pittman-Robertson program. A good example is the 500-acre Yellowstone Lake in Wis-

consin, which was financed in part by wildlife funds and in part by these fish funds combined on a single project.

Oklahoma has four combination projects where they can combine waterfowl and fish—waterfowl in the shoal waters and fish in the deeper waters. They use part of the financing out of Pittman-Robertson and part out of Dingell-Johnson. It works out very nicely.

In addition to our administrative activities, as a service to the States and others interested in the technical aspects of fishery work, we get out what we call the Dingell-Johnson quarterly—abstracting quarterly reports by the States so that the trade will know what is going on and thereby save duplication of effort and also encouraging project workers in various parts of the country to get in touch with project workers elsewhere. It hastens the time when they reach a logical conclusion on the problems on which they are working.

We also get out a survey of fishery projects going—that would be State, Federal, university, privately financed fishery projects—to inform people in the business what is going on and keep them acquainted with the activities, and at the recent request of the International Association of Game, Fish, and Conservation Commissioners, and the American Fisheries Society, the Federal-aid branch of the service will get out a sport-fishery publication containing the abstracts of publications on sport-fishery matters as an aid to the people who are working in the fishery field.

I have just one other thing before I close. I did want to mention what was brought to mind by Mr. Miller's comment a while ago. At the present time 8 of the State fish and game directors of the State departments served time on Pittman-Robertson projects, and in all the States 27 former Pittman-Robertson project workers are now employed as superintendents of game, as assistant directors of the departments, and as directors, evidencing the fact that these technically trained boys have come up through the ranks in the last 16 or 17 years and are now occupying key positions in the State organization.

The CHAIRMAN. Sir, on behalf of the committee, I want to thank you for your most interesting testimony here.

At the beginning of these hearings the chairman of the committee wrote a letter to each State department of fish and wildlife service. I want to ask the clerk if that is correct.

Miss STILL. Not to the State directors, Mr. Bonner, but to the people who are engaged in wildlife conservation work.

The CHAIRMAN. It was my understanding that we were to write to the States and to the societies interested in fish and wildlife.

Miss STILL. We wrote to the societies, but not to the State departments of conservation and wildlife.

The CHAIRMAN. That will conclude the hearings today.

The witnesses tomorrow will be Mr. Suomela, Mr. Thompson, and Mr. Hagen. The topics will be Alaska fisheries, salmon, fur seals, game fish, and so forth.

I say again that I am interested in the Pacific coast, but I do hope that we get as much as we can on the Atlantic coast here.

Thank you very much.

Mr. TOLLEFSON. Mr. Chairman, could I ask Mr. Rutherford one question?

The CHAIRMAN. Yes.

Mr. TOLLEFSON. Do I understand that there are some unused Pittman-Robertson funds?

Mr. RUTHERFORD. Yes, sir; there are about $13.5 million.

Mr. TOLLEFSON. And those funds cannot be used without some further legislation; is that correct?

Mr. RUTHERFORD. I wouldn't say they could not be used. They might be put in the budget. That is what the Budget Bureau said last year when it submitted a report to the Congress. It said that you did not need legislation to get this money out, but it would be put in the budget. So it would take legislation.

Mr. TOLLEFSON. There are some bills pending dealing with this sum?

Mr. RUTHERFORD. Yes, sir.

The CHAIRMAN. Mr. Miller.

Mr. MILLER. Of course, the trouble is going to be now in giving some forewarning to the States so that they can prepare moneys to match these funds. They would still have to go to the State on a 25–75 matching basis, would they, Mr. Rutherford? The States would still have to match with 25 percent of that $13 million; is that right?

Mr. RUTHERFORD. Is that a question, Mr. Miller?

Mr. MILLER. The States would still have to have their matching funds in order to get this $13 million?

Mr. RUTHERFORD. In one approach they would.

Mr. MILLER. If you do not modify the present law?

Mr. RUTHERFORD. Yes.

Mr. MILLER. Therefore the States are going to have to have over $13 million and there are not any of the departments which could, out of their funds, put up this matching money unless we give them some forewarning that the money is going to come to them.

The CHAIRMAN. Let the Chair say, then, that we have directed the clerk to the committee to ask for reports. One report came in this morning. Certainly, when hearings are held, which hearings I intend to hold on the bills, I am going to write each State department that it is the purpose of this committee to hold hearings, and inform them that we would like to hear their views.

Of course, we will hear the views of the Fish and Wildlife Service.

With that we will stand adjourned until tomorrow morning at 10 o'clock.

(Whereupon, at 12:35 p. m., Wednesday, March 9, 1955, the hearing was adjourned to reconvene at 10 a. m., Thursday, March 10, 1955.)

STUDY OF THE OPERATIONS OF THE FISH AND WILDLIFE SERVICE

THURSDAY, MARCH 10, 1955

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D. C.

The committee met at 10 a. m., pursuant to recess, in room 219, Old House Office Building, Hon. Herbert C. Bonner (chairman) presiding.

The CHAIRMAN. The committee will come to order.

We will continue the hearings with the Fish and Wildlife Service.

The witness this morning will be Dr. Meehean. Will you give your full name, please?

STATEMENT OF DR. O. LLOYD MEEHEAN, ASSISTANT TO THE DIRECTOR, TECHNICAL SERVICES, FISH AND WILDLIFE SERVICE—Resumed

Dr. MEEHEAN. Dr. O. Lloyd Meehean, Assistant to the Director of Fish and Wildlife Service. I appeared before this committee yesterday so that you have the background. I am sorry that Mr. Suomela, who has charge of the Alaska Fisheries and other fisheries activities, is not able to be with us this morning. He asked me to substitute for him.

We are continuing our review of the Service's fisheries activities and we want to present to you this morning a review of the current situation concerning Alaska fisheries resources, the status of fur seals of the Pribilof Islands, and the fish culture functions as they relate to the productivity and management of the Nation's inland waters.

The Alaska fisheries resources after 85 years of commercial utilization still form the basis of the Territory's most important industry. The commercial fisheries are the mainstay of Alaska's economy. They are the chief source of employment, of income, of tax revenue, and shipping business.

There are approximately 250 fishery wholesale and manufacturing establishments in Alaska and between 25 and 35 thousand persons are engaged in the industry. More than 25 species of fish and shellfish are used, and the products of the industry have an average annual value approaching $100 million.

Some of these fisheries have not been as productive as they were 20 years ago. An attempt has been made to isolate the causes for their decline and a vigorous program has been adopted to rehabilitate them.

The fur-seal herd at the Pribilof Islands is often cited as an example of an achievement through international cooperation. This herd in

1910 was threatened with extinction and contained only about 125,000 animals. Protection was provided in 1911 by a treaty between the United States, Great Britain, Japan, and Russia, which prohibited pelagic sealing or the killing of seals at sea. This treaty was supplanted by a provisional agreement between the United States and Canada when it was abrogated by Japan in 1941.

The international protection afforded by these treaties together with sound management practices have restored the herd to its maximum size of approximately 1½ million animals. During the period of restoration extending over the past 45 years, the herd has yielded almost 2 million sealskins. This has been a most successful and rewarding conservation project.

Mr. Seton Thompson, who for many years has been in charge of the fur-seal management in Alaska, is here to describe these activities to you.

STATEMENT OF SETON H. THOMPSON, CHIEF, BRANCH OF ALASKA FISHERIES, FISH AND WILDLIFE SERVICE

Mr. THOMPSON. Mr. Chairman, my name is Seton Thompson. I am Chief of the Branch of Alaska Fisheries of the Fish and Wildlife Service.

The CHAIRMAN. What is your background, sir? How long have you been with Fish and Wildlife Service?

Mr. THOMPSON. Except for about 5 years during World War II, I have been with Fish and Wildlife Service a total of 25 years. Most of my experience has been in connection with Alaska activities, Alaska fisheries and fur seal management and research work.

Mr. Chairman and members of the committee, alarming reports have come out of Alaska during the last 2 years that there has been suffering and hardship, even starvation, in some parts of the Territory because the salmon runs have been poor. The catches have been small and insufficient to supply the people with the money they need on which to live. After the close of the 1953 fishing season the President declared two major areas in Alaska to be disaster areas. Surplus agriculture crops, supplies were shipped in by air to those areas to relieve the situation. I mention that only to show you how dependent the Territory is on the fishery resources for its existence.

Without any doubt, the fishery resources at the present time are the Territory's most valuable asset. It may be that some of the undeveloped resources will sometime replace it. We have tremendous waterpower potential in the Territory. There are enormous forests just beginning to be used and there are undoubtedly mineral deposits that have not been tapped, but today, at least, the commercial fisheries are the mainstay of Alaska's economy.

They yield products worth between $80 million and $100 million, and they are a major source of tax revenue for the Territory. They employ every year about 30,000 persons. They are a major source, also, of tax revenue for the Federal Government.

In Alaska at the present time about 25 species of fish and shellfish are being used commercially. The salmon by far is the most important. There are 5 species of these and they account for approximately 75 percent by volume, by weight, and about 90 percent by value of

the output of the Territory's fisheries. Halibut, herring, clams, crab, and shrimp are also important, but far less than salmon.

The Fish and Wildlife Service has broad authority to regulate fishing in the Territory. It has authority under the basic Alaska fishery law known as the White Act, to limit fishing as to time, means, methods, and extent.

We have a staff in the Territory of permanent employees numbering about 35. They are management biologists and enforcement agents, and during the active fishing season they are assisted by 250 to 260 temporary seasonal workers who are stationed around the mouths of important salmon streams to prevent poaching.

The salmon, as they come in to spawn, are intercepted in the commercial fishery. They reach, if they pass through the fishery, the stream mouth and school there for several weeks or longer and they are extremely vulnerable to capture. The stream guard program is one of preventive enforcement. We feel that that has distinct advantages over the punitive type of enforcement, that of going out and catching a man after he has committed a violation. So all of our enforcement is directed primarily to preventing violations.

We have 7 airplanes in Alaska that we use for transport and patrol for servicing the stream guards. They are all surplus military aircraft which the Service obtained without charge, fixed up and have kept in service. We have 6 seagoing patrol vessels suitable for also tending the stream guard and then we have about 25 small so-called speedboats that are used to patrol the more or less inland waters in rather restricted areas.

Since the salmon fishery is most important in value and in products in the Territory, I think it might be of interest to the committee to examine its status somewhat more in detail.

It has a most interesting history. It got started in the Territory very soon after Alaska was purchased from Russia. The first cannery was established in Alaska about 11 years after the purchase of the Territory. The canning business did not expand very rapidly, though, until about 1890 and then from 1890 to 1918 there was a terrific expansion era. By 1918 the salmon fishery had reached full maturity. It was fully exploited and the production in 1918 numbered about 6½ million cases. One hundred and thirty-five canneries were in operation.

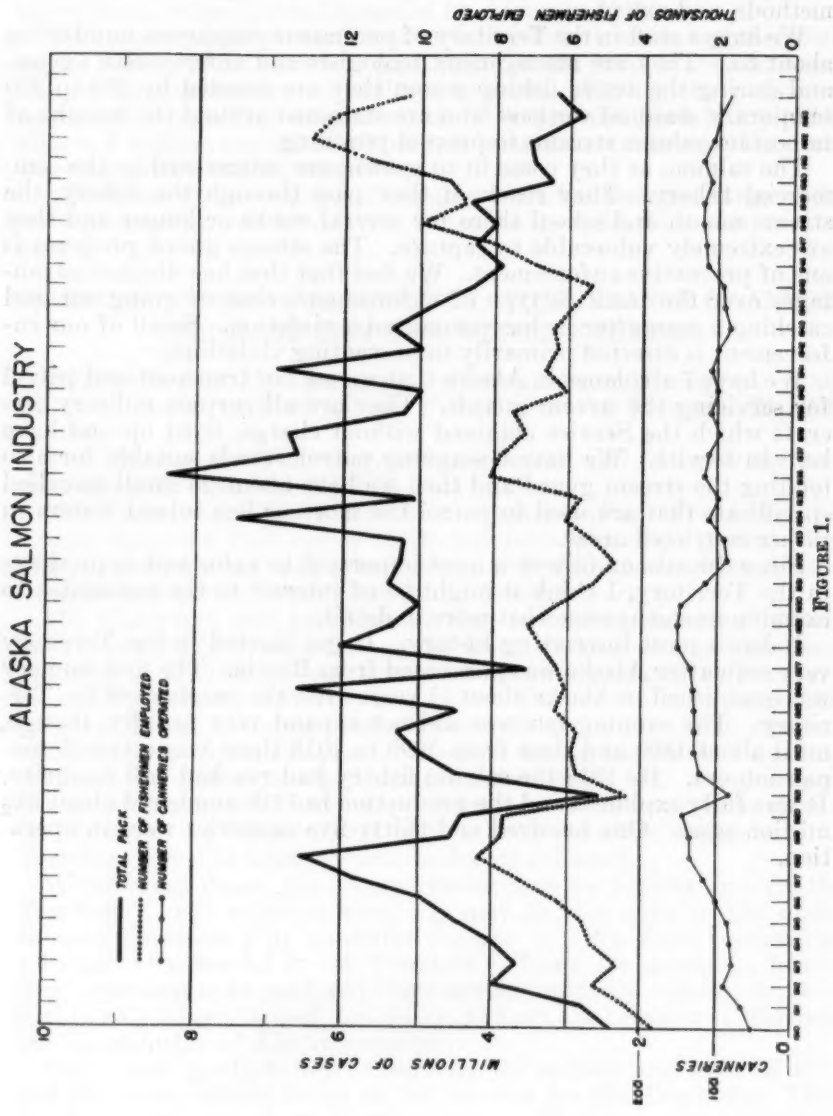

ALASKA SALMON INDUSTRY
TOTAL PACK
NUMBER OF FISHERMEN EMPLOYED
NUMBER OF CANNERIES OPERATED
MILLIONS OF CASES
THOUSANDS OF FISHERMEN EMPLOYED
CANNERIES
0
2
4
6
8
10
12
100
200

FIGURE 1.

This is a chart showing the picture of the salmon industry from 1910 to the present time. In 1918 we had this peak here. It has been exceeded only six times since that year. That chart, Mr. Chairman, shows the number of canneries operating during this 45-year period, 1910 to the present. It looks like a fairly stable number of plants fluctuating around 100, but this does not reflect the phenomenal improvement that has taken place in the efficiency of cannery operation. I think it is safe to say that this number of plants, from 1910 to the present time, has by far exceeded in capacity the ability of the fishery to provide raw material.

This dotted line shows the number of fishermen employed in Alaska, and generally, while that has fluctuated through the years, it has been around 6,000 or a little more than that until the postwar years beginning in 1946. Since that time there has been a steady rise until the last 2 years. That rise represents more than doubling of the fishing effort in Alaska between 1946 and 1952.

The top line represents the production or the number of cases of salmon packed in the Territory. Again there have been rather wide fluctuations. In 1918 we had the first peak and in 1936 we have over an 8 million pack and the all-time high. The startling thing here is the steady downward trend in production that has taken place since 1942.

In Alaska we have no conflicting water uses as they have in the States. Our salmon streams are not impeded by dams. We have no pollution problem whatever. There is no conflict in jurisdiction. The Fish and Wildlife Service has complete responsibility for the maintenance of the salmon runs through its authority to regulate.

What has caused this decline? What is being done at the present time? To show that it is necessary to break that total production figure down. We must remember that we have about 10,000 miles of coastline where commercial salmon fishing takes place. We have five species of salmon to deal with. Each of those species has its own life history, its own peculiarities, and regulation has to follow and be adjusted to those characteristics.

We have 13 major districts in Alaska and each of those is regulated according to the species represented in that district and according to the characteristics of those species.

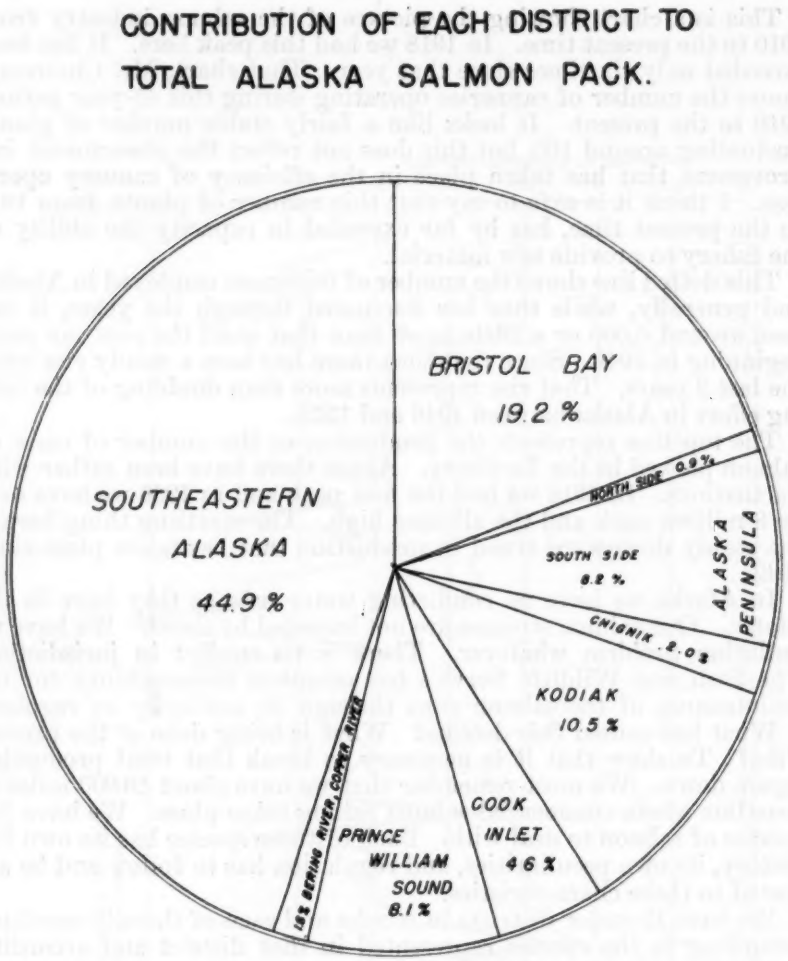


FIGURE 2.

From this chart we can see where the salmon are packed and the importance of each district in that production.

Southeastern Alaska accounts for almost half of the total salmon pack. Bristol Bay is second in importance with almost 20 percent. The Alaska Peninsula, Kodiak, and Prince William Sound, are also important.

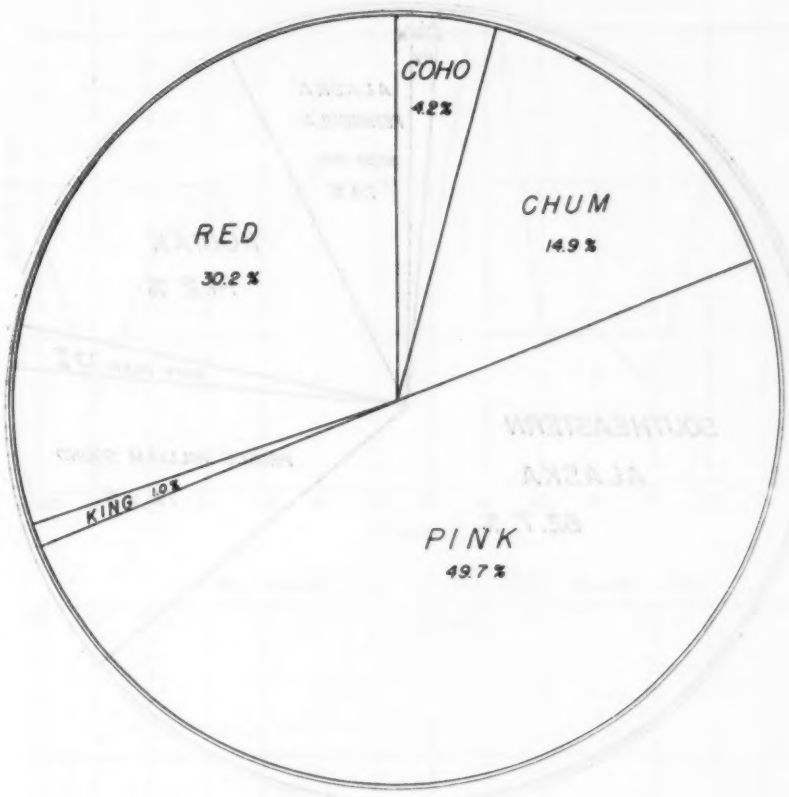


FIGURE 3.

Then what species are important in the Territory? Again we find the pink salmon accounting for almost half of the total production. This is a long-time average from 1925 to 1952 of about 5¼ million cases. Pink salmon account for approximately half, red salmon for about 30 percent, and chums about 15 percent; kings and cohoes are relatively insignificant in the total production.

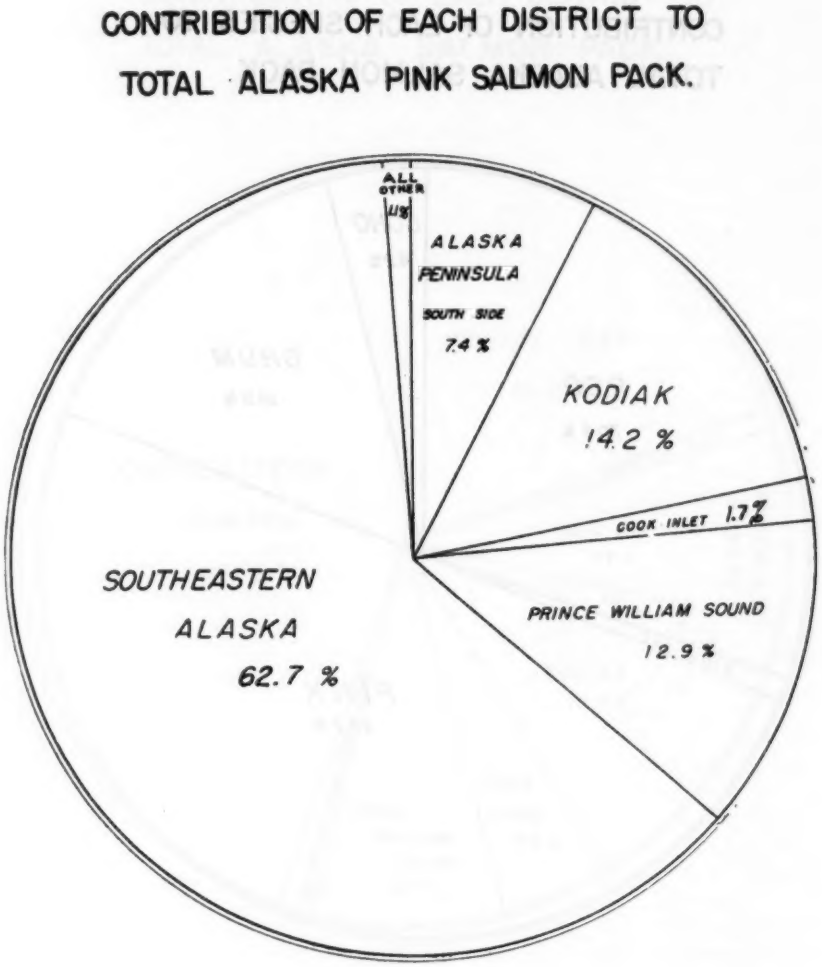


FIGURE 4.

Since pink salmon are so important in the total production, I think it is interesting to see where they come from. Southeastern Alaska, amounts for almost two-thirds of the total pink salmon pack, Kodiak about 14 percent, and Prince William Sound 13 percent.

Since southeastern Alaska accounts for about 45 percent of the total production and two-thirds of southeastern's production is pinks, it is interesting to see what has happened to those southeastern Alaska pink salmon runs because that will tell us why or tell us partially why the total salmon pack has gone down.

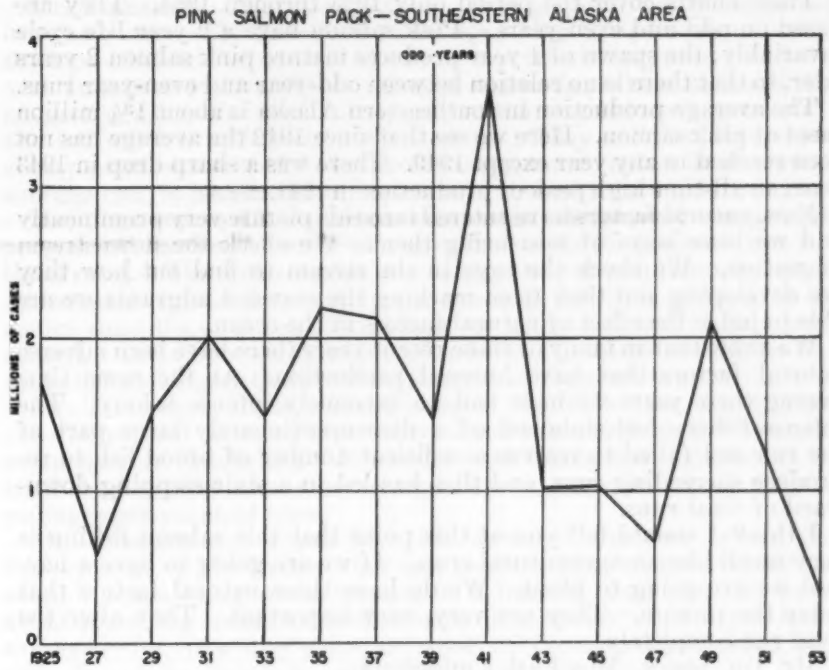


FIGURE 5.

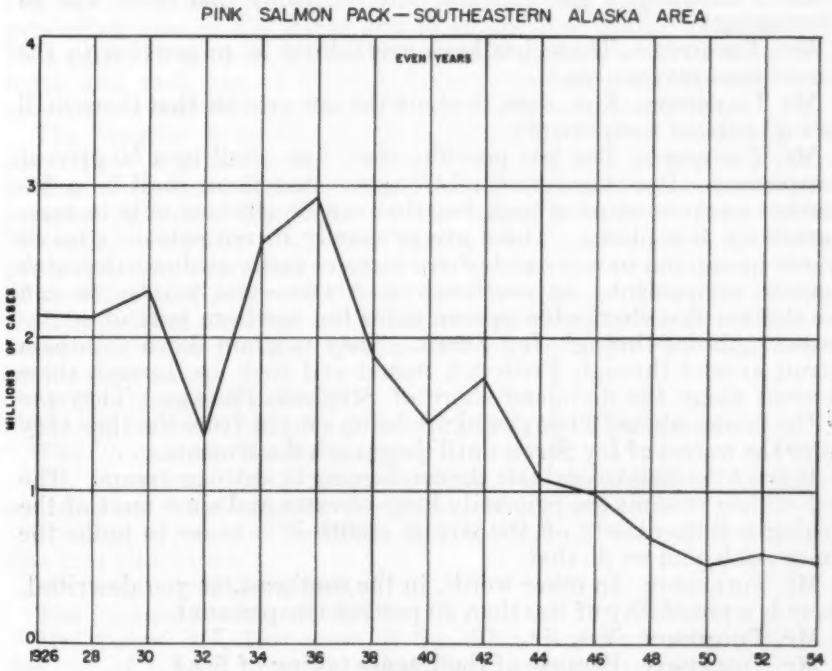


FIGURE 6.

These charts cover the period only 1925 through 1954. They are based on odd and even years. Pink salmon have a 2-year life cycle invariably; the spawn of 1 year produces mature pink salmon 2 years later, so that there is no relation between odd-year and even-year runs.

The average production in southeastern Alaska is about 1¾ million cases of pink salmon. Here we see that since 1942 the average has not been reached in any year except 1949. There was a sharp drop in 1943 from an all-time high peak of production in 1941.

Now, natural factors have entered into this picture very prominently and we have ways of measuring them. We check the downstream migration. We check the eggs in the stream to find out how they are developing and then from marking the seaward migrants we are able to judge the effect of natural factors in the ocean.

We know that in many of these recent years there have been adverse natural factors that have lowered production. At the same time during these years we have had an extremely intense fishery. The intense fishery has siphoned off a disproportionately large part of the run and failed to reserve a sufficient number of brood fish to reproduce succeeding runs, and that has led to a stair-stepping downward of total runs.

I think I should tell you at this point that this salmon fishing is very much like an agricultural crop. If we are going to have a harvest we are going to plant. We do have these natural factors that enter the picture. They are very, very important. They alter the total run completely.

Mr. TOLLEFSON. May I ask a question?

The CHAIRMAN. Mr. Tollefson.

Mr. TOLLEFSON. I gather from your testimony that there was an overfishing?

Mr. THOMPSON. There has been overfishing in proportion to the size of the runs; yes, sir.

Mr. TOLLEFSON. Now, then, does not the law provide that there shall be a 50-percent escapement?

Mr. THOMPSON. The law provides that there shall be a 50-percent escapement. It is the intent of Congress that there shall be a 50-percent escapement of salmon, but that can be attained only in comparatively few places. Those are primarily in red salmon streams where we can put in weirs and where we can exactly evaluate the catch against escapement. In southeastern Alaska—and maybe we can see it from this chart—the salmon enter the northern part of southeastern Alaska through Icy Strait. They migrate down Chatham Strait around through Frederick Sound and back up through these streams along the mainland shore of Stephens Passage. They are in the fishery almost 60 days and are being caught from the time they enter the waters of Icy Strait until they reach the streams.

It is not possible to evaluate the catch going to any one stream. The red-salmon streams are primarily large streams and since most of the fishing is immediately off the stream mouth it is easier to judge the exact catch, and we do that.

Mr. TOLLEFSON. In other words, in the southeast, as you described, there is a possibility of less than 50-percent escapement?

Mr. THOMPSON. Yes, sir.

Mr. TOLLEFSON. Because of the intense taking of fish?

Mr. THOMPSON. That is very true. That unquestionably happened in some years. The reservation of a spawning escapement or brood stock on the basis of percent is not a very satisfactory one. If natural factors so reduce the run that it is small, perhaps it would be no greater than the required escapement to reproduce a good run, and half of that will do very little for us. They will just reproduce a very poor run so that a 50-percent escapement, unless it is a good average run, is insufficient.

Mr. TOLLEFSON. I am curious about that 50-percent-escapement proposition in view of what has happened with the Sockeye run up the Fraser. The Commission has taken the view apparently, as I understand it, that they only want so many fish in a given area to spawn since the area can only support so many fish, and if they permitted a 50-percent escapement of a large run there would be too many fish getting up there and that would not be good.

Mr. THOMPSON. That is exactly right, Mr. Tollefson. In a large run a 50-percent escapement is wasteful and in a small run a 50-percent escapement is insufficient. It was for that reason that I said that to treat the escapement on a percentage basis is not satisfactory from a management point of view.

Mr. TOLLEFSON. I appreciate that down in the area where the Sockeye run up the Fraser, they can perhaps have more information about the spawning areas because it is limited, than you can have about spawning areas in Alaska because it is so terrific; but you have surveyed the spawning areas or some of them to know what the potential of the area is to support so many spawning fish.

Mr. THOMPSON. Yes, sir, we have in Bristol Bay, which is the main red salmon producing area—it is probably the largest red salmon producing area in the world and there are four major districts and four major streams each with its own lake systems and tributary systems, and each one of those tributary systems maintains its own race that is typical and characteristic of that stream itself.

The progeny from the spawning in that tributary stream go to sea. They will be out for 3 years or 2 years and return invariably to that very home stream. Now, we do have two measures of the escapement there. In three of those major streams we have weirs. We count every fish that passes through and later make a spawning ground survey that takes weeks to do because the area is great. One of the lakes on this Kvichak River is 90 miles long. There are islands that have lakes on them and those are spawning grounds. There is an evaluation of the spawning in each of the major spawning areas on those streams.

Mr. TOLLEFSON. That is all.

Mr. BARTLETT. Could I ask one question, Mr. Chairman?

The CHAIRMAN. Mr. Bartlett.

Mr. BARTLETT. Mr. Thompson, when was the intent of Congress expressed with reference to the 50-percent escapement?

Mr. THOMPSON. In the White Act of June 6, 1924. That act carries that stipulation.

Mr. BARTLETT. Thank you.

The CHAIRMAN. Mr. Allen?

Mr. ALLEN. Mr. Thompson, if the White Act went in in 1924 and the run of salmon has been going down consistently in the last few

years, does that indicate that the legislation we have is not the proper legislation for the protection of resources?

Mr. THOMPSON. The basic guide lines set by the statute are sound and certainly did protect the fishery during those years when it was fully exploited during the period up until 1942. Since that time there has been a tremendous expansion of fishing effort in Alaska and there perhaps would be better control if there was some authority to limit the number who would engage in fishing—the number of units of gear that could engage in fishing in any one area.

While some areas do not show this decline that we have in southeastern Alaska and I have some charts to show that, in those areas there has been an increase in fishing effort just as there has been in southeastern Alaska. By two applications of compensatory restrictions, however, the catch has been pegged or held at a fairly constant level and the runs are being maintained. Cook Inlet is an example of that.

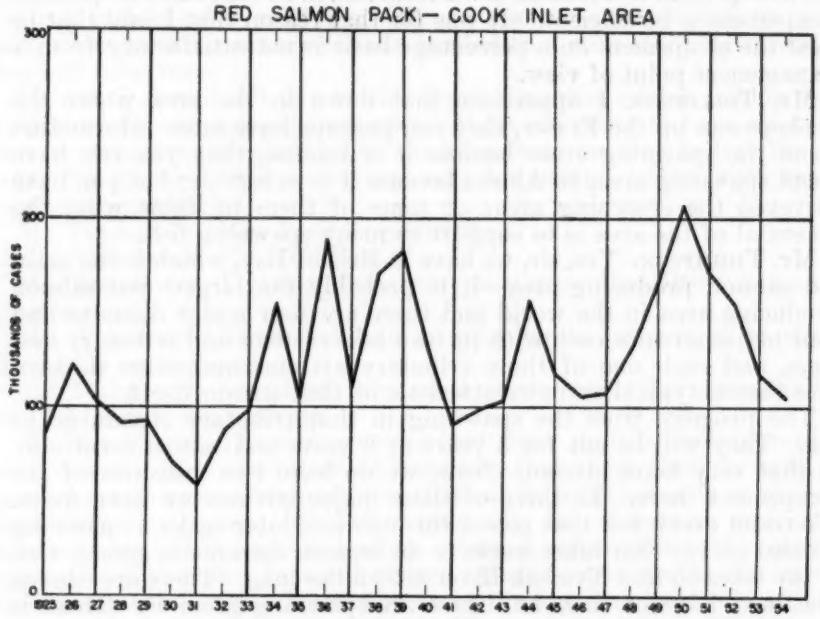


FIGURE 7.

During the war years and the prewar years, they fished 5 days a week. Today they are fishing 2 days a week. There are three times as many fishermen engaged in that fishery and the catch is the same, but the catch per man is far less than it was before.

Mr. ALLEN. Thank you.

Mr. THOMPSON. With regard to southeastern Alaska the Service has embarked on a vigorous restoration program. It appeared that it was not possible with the amount of fishing effort, the intensity of fishing, to apply regulations alone that would allow for a sufficient number of spawners, so in cooperation with the industry there was a reduction of 50 percent of the trap effectiveness beginning in 1954.

Sanctuaries around the mouths of salmon streams were greatly increased so that there would be more protection for them after they reached the spawning grounds, and we expanded our protective enforcement staff. Those three things have resulted in probably the best escapement, the best reservation of brood stock that we have had in southeastern Alaska since 1949.

The CHAIRMAN. Mr. Bartlett.

Mr. BARTLETT. Mr. Thompson, you spoke about the cooperation of industries in effecting this reduction in gear. From a legal standpoint, could you have done that without a cooperative attitude on the part of industry?

Mr. THOMPSON. Perhaps we could, Mr. Bartlett, but it would have been difficult to do for this reason: Our authority to regulate is to protect and conserve the runs. There is no authority to regulate for the economics of the fishery or for the social factors or impacts that might be inherent in fishing in Alaska. There were about 300 fish traps in southeastern Alaska. I am picking that figure out of the air, but it is perhaps a little high. It is impossible to put a finger on any one, and say by eliminating that one trap the number of brood salmon will be increased.

It was for that reason that we went to the packers and said we would like to have cooperation in reducing trap effectiveness. "Which traps will you offer for closure?" You have to account for 50 percent of the fish, not 50 percent of the traps.

Mr. BARTLETT. Was there a corresponding reduction in other types of gear?

Mr. THOMPSON. There was no corresponding reduction in number of units of other gear operating if you are referring to purse seines.

There was a corresponding reduction in area in which that gear was fixed. By increasing the area of sanctuary around the stream mouths fishing was limited by the purse seines. That is true. They cooperated.

Mr. BARTLETT. How long will that program of reduction continue, Mr. Thompson?

Mr. THOMPSON. That is for 2 years, one cycle of pink salmon.

Mr. BARTLETT. Then if the run is restored what is going to protect it in the future?

Mr. THOMPSON. We will have to anticipate two things. We will have to be able to forecast with greater accuracy the runs of salmon expected in succeeding years. We will also have to be able to predict with greater accuracy than we have in the past the number of units of gear that will be working on that.

Our research people are trying to develop better means of forecasting.

There is still a third item there. That is the method of judging or evaluating the run while fishing is still in progress. That is difficult because the runs are usually over a very short space of time. Some of these runs come in, they are in progress, for less than a month. Bristol Bay is an example of that. There are probably only 20 days of fishing in the Bristol Bay area. So that better forecasting, better knowledge of fishing effort that may be expected and better evaluation of runs while fishing is in progress will all lead to better regulation of the fishery.

Mr. BARTLETT. Thank you, Mr. Chairman.

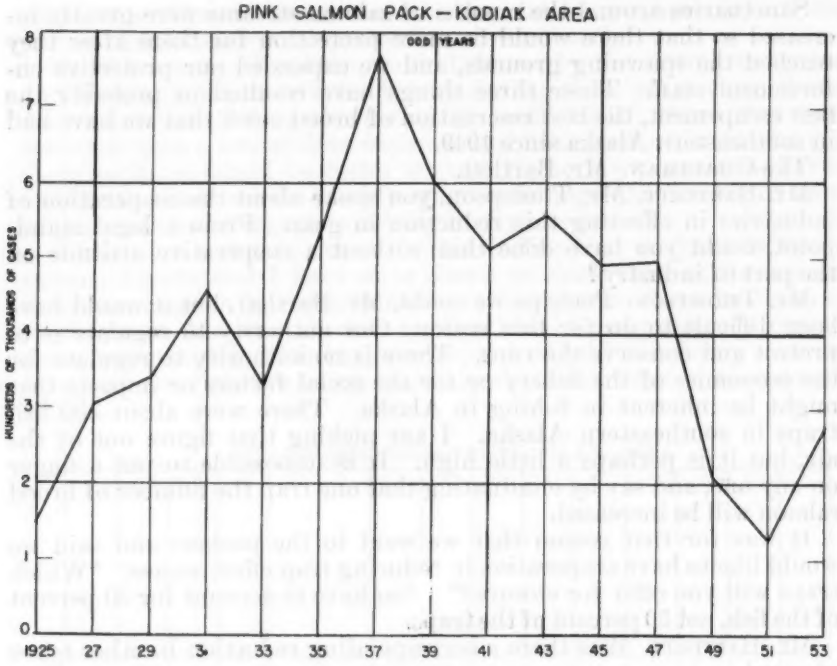


FIGURE 8.

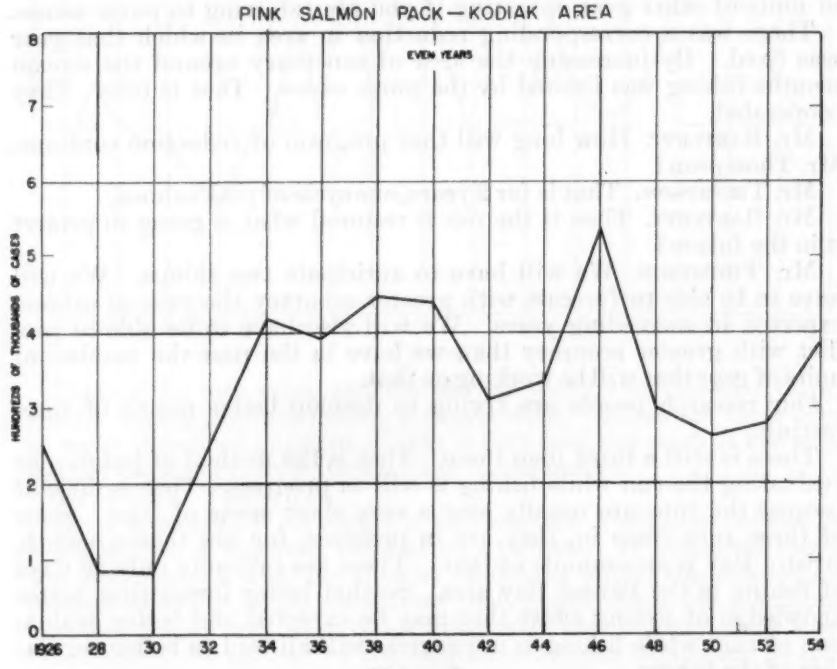


FIGURE 9.

Mr. THOMPSON. I have another area that presents not quite such a dismal picture as southeastern Alaska. That is the Kodiak area. It is a pink salmon producing area also. It accounts for about 15 percent of the total pink salmon pack. Here, as soon as the downward trend became evident, additional restrictions were applied.

It is a more limited area than southeastern Alaska. It is easier to control and easier to manage. The runs are easier to evaluate when they are in progress, and fishing is being carried on. So, with the evidence of smaller runs, additional closures were imposed. These were closures in the form of midseason closures.

From 1949 to 1953 there was a 2-week midseason closure during which all the salmon entering the area were allowed to reach the spawning grounds and reproduce. That has already brought evidence of a return; both in the odd and even year cycles.

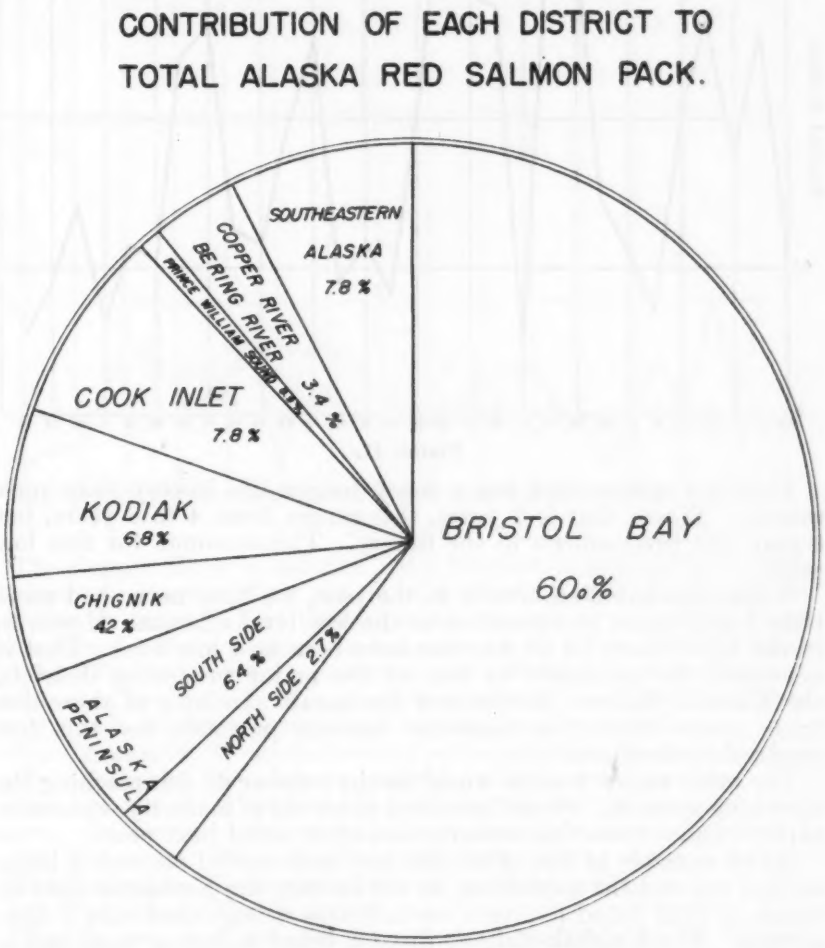


FIGURE 10.

Since red salmon are second in importance, I thought that the committee would like to see where the red salmon come from: 60 percent from Bristol Bay. The rest of the areas are less important. Bristol Bay has a long-term average production of about 1 million cases of red salmon. It has had a very erratic record marked by low points at regular 5-year intervals, in the years divisible by 5.

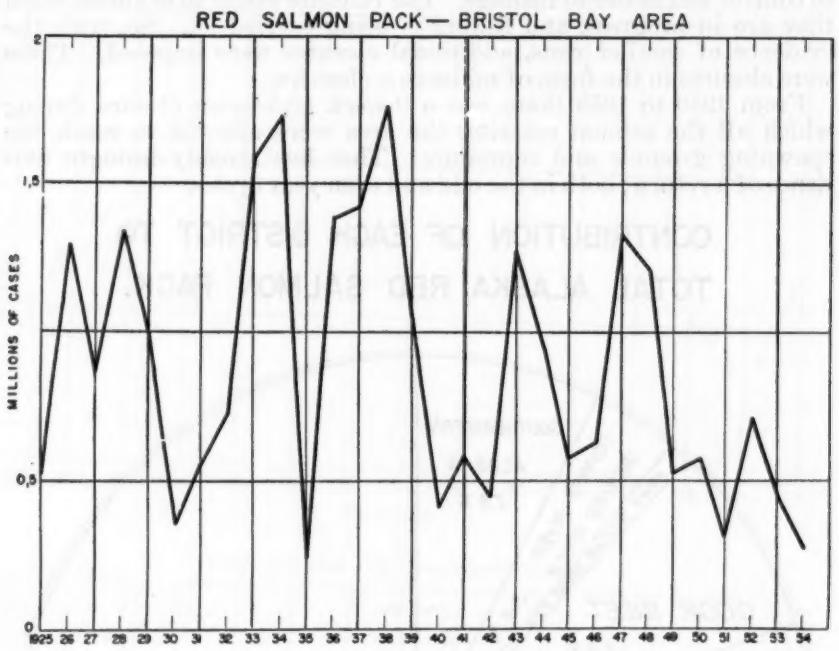


FIGURE 11.

This is a species that has a much longer life history than pink salmon. Where that is 2 years, this ranges from 4 to 8 years, but 5-year-olds predominate in the fishery. This accounts for this low point.

While this has been erratic in the past, we have never had more than 1 or 2 years in succession at the low level of runs. However, in the last 6 years all of the runs have been at a low level. That is accounted for primarily by two of the major producing districts, the Kvichak-Naknek district and Nushagak. In both of those districts severe restrictive measures account partially for this low production of salmon.

The other major feature would be the number of fish reaching the spawning grounds. Since these are 5 years old at maturity, we cannot expect results from this conservation effort until next year.

As an example of the effort that has been carried on, and is being carried on, and the imposition on the fishery, the Nushagak district, which in 1949 fished 5 days a week, is now being fished only 2 days a week. The Kvichak-Naknek district fished 5 days a week and is now being fished 3 days a week.

In the Cook Inlet area we find probably the most stable production of salmon in Alaska. It is erratic to be sure, but as salmon

go it is still a stable producing area. I mentioned a moment ago that the number of fishermen engaged in Cook Inlet has tripled since 1947. The catches, however, are still being maintained. We had a terrific increase in 1950 that was not anticipated. It came about as a result of a new form of gear entering the picture that had not been there previously, and operating successfully. Additional closures were imposed, but in spite of those closures the catch reached an all-time peak. We will probably pay for that in a smaller catch this year. That is now on a 2-day basis, whereas in the past it fished 5 days a week.

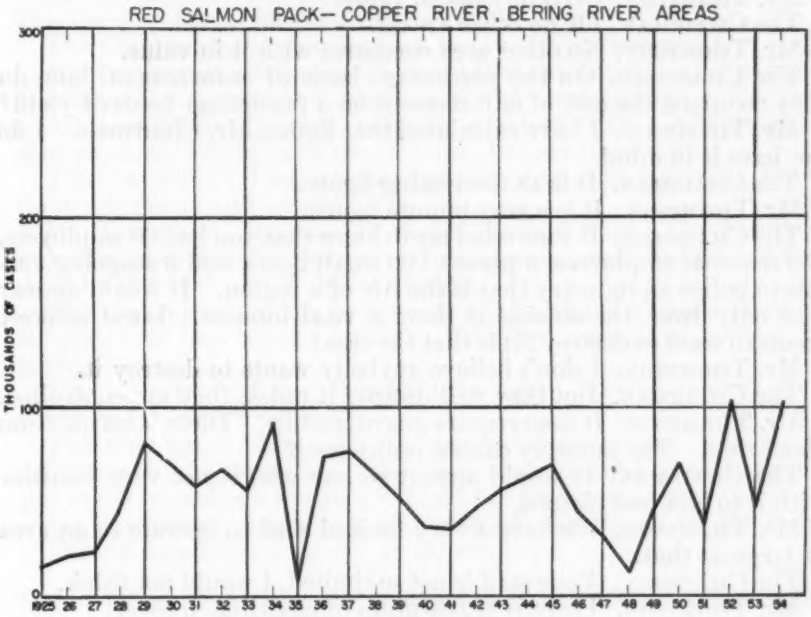


FIGURE 12.

The Copper River is another. Mr. Bartlett is familiar with that. It shows an increase when you plot the trend. There again, with the increase in fishing effort there was an imposition of compensatory restrictions. Those restrictions seem to exactly offset the increase in fishing effort to such an extent that now the catches are as large or larger than they have been in previous cycle years, and yet the spawning grounds are being adequately and completely seeded.

The CHAIRMAN. What did you say is the largest business in Alaska?

Mr. THOMPSON. The salmon business is the largest business.

The CHAIRMAN. That and the military are the two greatest businesses. Industrially, this is practically the only business; is it not?

Mr. THOMPSON. Yes. New businesses are opening in the Territory.

The CHAIRMAN. Everything lives on this fishing business?

Mr. THOMPSON. That is correct.

The CHAIRMAN. From your appearance here this morning it seems that it is about to disappear; is it?

Mr. THOMPSON. I am fully confident, Mr. Chairman, that by using the methods that we are using now the salmon fisheries can be restored

and restored within a very reasonable time. Progress is already being made in that direction.

In the Kodiak area, I think I showed you that runs there are already on the mend. In southeastern Alaska, with the restrictions imposed last year, there should start to be a showing of results next year.

The CHAIRMAN. Compared to other areas of similar size, this is the greatest fishing area of the North American continent; is it?

Mr. THOMPSON. I think that is true.

The CHAIRMAN. The North Atlantic does not compare in production?

Mr. THOMPSON. Certainly not in value.

The CHAIRMAN. Or no other areas?

Mr. THOMPSON. No other area compares with it in value.

The CHAIRMAN. On the percentage basis of enforcement, how do they compare, the cost of enforcement on a percentage basis of yield?

Mr. THOMPSON. I have calculated that figure, Mr. Chairman. I do not have it in mind.

The CHAIRMAN. It is an interesting figure.

Mr. THOMPSON. It is a very minute figure.

The CHAIRMAN. It interested me to know that you had 30 employees, 260 seasonal employees, 6 planes, 200 small boats, and 6 seagoing vessels to police an industry that is the life of a region. It would appear that only from the outside is there a vital interest. Local interest seems to want to destroy it; is that the case?

Mr. THOMPSON. I don't believe anybody wants to destroy it.

The CHAIRMAN. But they will destroy it unless they are controlled.

Mr. THOMPSON. It does require guardianship. There is no question about that. The industry cannot police itself.

The CHAIRMAN. It would appear to one who is not very familiar with it to be a bad picture.

Mr. THOMPSON. We have a very limited staff to operate in an area as large as that.

The CHAIRMAN. Your staff is not so limited, I would not think.

Mr. THOMPSON. There is 10,000 miles of coastline to cover.

The CHAIRMAN. I know that it is a rugged country. From what you picture there, man is just carrying out his normal way of doing business in destroying things.

Mr. THOMPSON. I think that is true, but I do think that we are making a recovery now.

The CHAIRMAN. What would become of the area if this fishing industry is destroyed?

Mr. THOMPSON. Alaska would really be in serious shape. The decline that we have already experienced resulted in disaster areas being proclaimed.

The CHAIRMAN. The only supervision is through your area?

Mr. THOMPSON. Yes.

The CHAIRMAN. There is no Territorial supervision?

Mr. THOMPSON. There is a Territorial Department of Fisheries, but it does not exercise supervision over the fisheries, Mr. Chairman.

The CHAIRMAN. What revenue is derived from the effort of protection here?

Mr. THOMPSON. There is no revenue to the Fish and Wildlife Service from the protection.

The CHAIRMAN. Is there revenue to the Territory?

Mr. THOMPSON. There is revenue to the Territory which I think amounts today to about 40 percent of the total Territorial revenue.

The CHAIRMAN. How much do they get? Just how is it done? Give us an example of what goes on.

Mr. THOMPSON. I just don't think I have that figure in my mind, sir.

The CHAIRMAN. Other States have certain fishing laws and rules and regulations and fees for fishing. Do they have fees in Alaska?

Mr. THOMPSON. There are Territorial fees.

The CHAIRMAN. What do they do with the money?

Mr. THOMPSON. The money is appropriated for various Territorial functions by the Territorial legislation.

The CHAIRMAN. Does it go back to the fishing industry?

Mr. THOMPSON. It does to the extent that the Territorial department furnishes 5 or 6 seasonal workers to us who are deputized. The Territorial department is doing research in Alaska also. The results of that research will be built into the regulations eventually.

The CHAIRMAN. You have two agencies doing the research. Do you do it separately and apart?

Mr. THOMPSON. It is coordinated at the field level. The Territorial department of fisheries carries on such research as it finds is not being done by the Fish and Wildlife Service.

The CHAIRMAN. What is the revenue to the Territory from this fishing, and how much does the Territory spend to protect this fishing?

Mr. THOMPSON. I can furnish that figure for the record. I am sorry that I cannot tell you.

The CHAIRMAN. Not with any spirit of criticism. I think this committee and anyone who reads this record would, if this were not put in the record, ask the question and not find an answer.

Mr. THOMPSON. I will be glad to furnish that figure for the record.

(The information referred to follows:)

Fishery license and business taxes collected by the Territory of Alaska for fiscal year ending Dec. 31, 1955 [1]

Source of tax:	Total
Cold-storage and fish processors	$69,450.48
Fishermen's licenses	97,280.00
Trap licenses	424,300.00
Gill-net licenses	9,377.00
Seine licenses	14,375.00
Raw-fish tax	2,028,100.64
Total	2,642,883.12

[1] Does not include Territorial income tax collected from the fishing industry since income-tax collections cannot, at present, be segregated as to source.

Funds appropriated for the Alaska Department of Fisheries for the biennium Apr. 1, 1953–Mar. 31, 1955

Fisheries Board	$7,500
Administration	60,800
Biological research	145,700
Inspection	110,430
Predator control (hair seal, etc.)	50,000
Sport fish	90,000
Watershed management	45,000
For Federal old-age tax	972
Total	510,402

The CHAIRMAN. I would like to have it recalled to my attention so that I can see it.

Mr. Bartlett?

Mr. BARTLETT. Of course, Mr. Chairman, this is the subject generally speaking of primary importance to Alaska, and since now this is principally for the purpose of explanation of its activities by the Fish and Wildlife Service I do not intend to go into the whole broad situation, but just in general I think I ought to add here for the record that Alaskans for many years have desired to obtain administrative control over their fishery.

They are States' rights people in that respect and they live in the only Territory in the history of the United States that has not had that authority.

The CHAIRMAN. We do not want to get into the States' rights proposition. I was only interested in this fishery business.

The charts here are discouraging to look upon, and if this great agency has not done any better than it has, I wonder could a Territorial or State agency do any better?

Mr. BARTLETT. We are perfectly willing to take it over the moment Congress allows us to do so, and appropriate whatever necessary money is required for regulation.

The CHAIRMAN. Where would the funds come from?

Mr. BARTLETT. They would come from local taxation, Mr. Chairman.

The CHAIRMAN. As I understand, this is the largest business in Alaska?

Mr. BARTLETT. It is the largest business in Alaska.

The CHAIRMAN. Where do the funds go now that are raised from this type of industry?

Mr. BARTLETT. They go for general purposes within the Territory.

The CHAIRMAN. What general purpose funds would you supplant?

Mr. BARTLETT. We would appropriate money out of the general intake of taxes for the fisheries.

The CHAIRMAN. What would you raise it from if this is the principal industry?

Mr. THOMPSON. Prior to the expiration of prohibition I think the fisheries accounted for nearer 70 percent.

The CHAIRMAN. What did prohibition have to do with it?

Mr. THOMPSON. There is a liquor tax in the Territory, sir.

The CHAIRMAN. There is a whisky tax there now?

Mr. THOMPSON. I say prior to the expiration of the Prohibition Act fisheries accounted for 70 percent of the Territorial revenue.

The CHAIRMAN. Now whisky is taking up probably 30 percent. Well, the financial part of this, Mr. Bartlett, is most interesting. It is evident from these hearings that the Territorial government is being run on taxes raised on this fishing industry.

Mr. BARTLETT. Forty percent of it, yes.

The CHAIRMAN. Very little of this money goes back to the protection or propagation of the source from which the revenue comes; is that correct?

Mr. BARTLETT. That is correct, but I think the wonder of it is that the Territory appropriates anything at all in view of the fact that it has no administrative authority.

The CHAIRMAN. I think that is a weak answer to the question. Pardon me for saying that. This must be a vitally interesting subject to the area and if now they are raising 40 percent of the area income from this source and putting back 5 people to perpetuate the instrument that raises this tax, that is interesting.

Mr. BARTLETT. In effect, Mr. Chairman, any moneys appropriated for that purpose would have to be turned over to the Federal Government for use in a cooperative way. The people in the Territorial department of fisheries would have nothing to say about the regulatory procedures because they have no authority. Congress retains that.

Mr. THOMPSON. Mr. Chairman, I would like to touch just briefly on the fur-seal management.

The CHAIRMAN. You have finished with the fishery?

Mr. THOMPSON. Yes, sir. Management of the fur-seal herd is another of the responsibilities of the Fish and Wildlife Service in Alaska.

The CHAIRMAN. Let me ask you one question. Under the procedure that is going on for regulation, do you anticipate any increase in the possible quantity of fish?

Mr. THOMPSON. I do not this year, Mr. Chairman, but next year most definitely we do.

The CHAIRMAN. How about the cycles?

Mr. THOMPSON. The season of 1956 will bring the return of the first really well-protected cycle in Bristol Bay. It will show the results also of the first aggressive, vigorous protection that has been afforded in southeastern Alaska.

The CHAIRMAN. It was interesting to hear you say that the Federal Government had to send relief into Alaska due to the diminishing of the fish run. That would be serious if it gets worse.

Mr. THOMPSON. That certainly is true. It is going to get better instead of worse. We are confident of that.

The CHAIRMAN. In the cycle of years?

Mr. THOMPSON. Yes, sir.

The CHAIRMAN. And there is no legislation needed to assist in that?

Mr. THOMPSON. We are not recommending legislation right now, Mr. Chairman. There is a study being made of that and——

The CHAIRMAN. Who is making the study?

Mr. THOMPSON. The Fish and Wildlife Service.

The CHAIRMAN. Thank you.

Mr. THOMPSON. The fur seal story is quite a different one than the salmon story.

Mr. ALLEN. Before we leave the salmon there are a couple of things I would like to clear up in my own mind.

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. It seems to me that over the years there have been phenomenal recoveries of the salmon run from time to time completely unpredicted and happening at the time that apparently you were not taking the precautions on which you now count to bring back the runs. Is that true?

Mr. THOMPSON. That is true. There are times when natural conditions will be extremely favorable to the survival of young, and the growth in the ocean before they return to spawn.

Now, the number of times that that happens as a result of poor spawning is very, very few.

Mr. ALLEN. It would seem to me that from what you have said this morning you are putting all the eggs in one basket in just this one single control of escapement.

It would also seem to me from these other recoveries with no such controls, that there are other factors that have not been discussed here which may have a tremendous effect on the life of the salmon.

Mr. THOMPSON. There are other factors and many of those factors, Mr. Allen, are not very well understood, and that is one reason why our forecasts have been imperfect and why we have not been able to lay on the line regulations well in advance of the time of the run; but those factors seldom offset an insufficient seeding of the spawning grounds.

You mentioned one basket. Let me say that in Alaska we have around 3,000 spawning streams, independent streams.

Mr. ALLEN. I had reference to the fact that your only control seems to be the matter of escapement and that if that is not the proper theory that what you are doing probably is not going to be the effective cause of any improvement, or at least not the sole cause. I was wondering if there are other theories of procedure to improve the runs that are also being looked into.

Mr. THOMPSON. There are other theories. I think Mr. Tollefson mentioned the Fraser River and the work that is being done there; the fact that escapement is not the only thing, the total number of fish escaping; that the time of the escapement, the quality of the escapement, are pretty important factors, too. If the fish arrive too soon on some of those spawning grounds on the Fraser River the fish will die without spawning. If they arrive too late the spawning is ineffective. So the important thing there is timing.

In Alaska we do not have quite the same situation as in the Fraser River. We do not have the great range of temperature that is the limiting factor on early arriving fish. We have relatively uniform temperatures during the spawning period.

There are these other factors, but certainly it is true that our regulation and our basic statutes are all aimed at securing an escapement of brood fish that over the years will reproduce the best run.

The CHAIRMAN. Where do the fish go in the cycle in the meantime?

Mr. THOMPSON. The young hatch in the spring following the spawning in the fall before. Then they go to sea. In the case of the pink salmon, the 2-year life cycle fish, they spend the next year and a half in waters along the coast. They are not seen because they are not captured by hook and line until they return as mature fish to ascend the streams to the spawing grounds.

In the case of the Chinooks, or king salmon, leaving the Columbia River they will spend a few years in fresh water before they leave for the sea. They make a rapid growth in the ocean and during that time they range as far south as Monterey Bay and as far north as southeastern Alaska. Their distribution is probably greater than that of most other species.

The CHAIRMAN. The ones that come in a cycle of 2 to 3 years are not caught anywhere else?

Mr. THOMPSON. They are not caught anywhere else.

Mr. ALLEN. May I find out a couple of things which I wanted to get?

You mentioned the salmon fishery as being the most valuable in, I think, the Northern Hemisphere. It is true that the other fisheries have almost equal or possibly greater value than the central Pacific tuna fishery; is it not?

Mr. THOMPSON. Yes.

Mr. ALLEN. We were talking the other day about the amount of money going into the development of the two resources. I think we had the figure of one and a quarter million dollars going into tuna. Do you have a comparable figure going into the protection of the salmon resources?

Mr. THOMPSON. The total expenditure this fiscal year will be about $1,300,000.

Mr. ALLEN. That is for the salmon?

Mr. THOMPSON. That is for the protection of salmon in Alaska.

Mr. ALLEN. Where is that money coming from?

Mr. THOMPSON. About $800,000 of that is appropriated funds. The balance is from the net proceeds of the fur seal industry.

Mr. ALLEN. The two industries, then, are getting about the same financial protection?

Mr. THOMPSON. Yes. One, I think, is aimed entirely toward research investigation, the other primarily toward enforcement of protective regulation.

Mr. ALLEN. Could you give us a little information on who carries on the industry? I think it used to be true that there were about 10,000 people carried up from the States to Alaska for the season and possibly another 10,000 of Alaskans who were engaged in this industry. Are those figures still about right?

Mr. THOMPSON. Just about 50–50. About half of the 30,000 employees are residents and about the same number are imported from the States. The industry, of course, is highly seasonal. The season extends in active status from about early May until mid-September.

Mr. ALLEN. Is it also still true in part that there is quite an argument over this control of the industry coming out of the fact that the Alaskans would like to control it for their 15,000 and the people from the States want to protect the industry from the standpoint of those who come up and bring this capital and some of the work?

Mr. THOMPSON. Within the unions, are you speaking of?

Mr. ALLEN. The unions and the management and ownership side.

Mr. THOMPSON. The management is primarily by capital in the States, the canneries and larger vessels and equipment used in the processing of fish.

The fishermen are about equally divided between residents and nonresidents of Alaska.

The capital investment in the industry is in the neighborhood of $70 million or $80 million. Very little of that represents Alaskan capital as I understand. We do not have specific figures on that.

Mr. ALLEN. Sometime ago you had a ship running up there. Do you still have a fair-sized seagoing ship under the control of either Interior or Fish and Wildlife?

Mr. THOMPSON. We have six vessels on fisheries duty that are capable of going to sea. I think the one that you are perhaps thinking

of is the *Penguin* which serves as a tender to the Pribilof Islands. It is another acquisition, too, from military surplus, which we have fitted to our purposes. It makes five trips a year to the Pribilof Islands to provide food and transportation to the fur-seal industry.

Mr. ALLEN. Was there one named the *North Star*?

Mr. THOMPSON. There was a *North Star*. I believe that was operated by the Bureau of Indian Affairs.

Mr. ALLEN. That was a ship of about 2,500 tons or more. Is that still running?

Mr. THOMPSON. That is far larger than anything we have. Ours are in the neighborhood of 400 tons, the largest.

Mr. PELLY. Mr. Chairman, could I ask the witness if there might be any relationships between the replenishment of the fur-seal herds and the diminishing number of salmon?

Mr. THOMPSON. Mr. Pelly, we think absolutely no relationship whatever. The fur-seal herd was practically restored to its original size of 1½ million animals during the late 1930's when the salmon runs were at their greatest peak. In other words, the fur-seal herd was already restored and the salmon runs were in the peak of their productive period. We do not believe there is any relationship from that aspect alone.

We have carried on food-habit studies and there will be other food-habit studies made in the Bering Sea this coming season. Those studies indicate that seals will eat whatever is readily available in the way of fish life, whatever is handy as food for them; but they do not pass through the waters where salmon fishing is an occupation at the time salmon are there.

At the Pribilof Islands when the salmon are entering the streams in Bristol Bay the seals are there; that is true. But the islands are 400 miles away and we don't believe the seals range that far from the island during the breeding season.

We are going to have studies this year. When the seals come ashore they have usually digested all the food they have eaten at sea and studies of the animals killed for the harvesting of skins show empty stomachs.

Mr. PELLY. A seal could account for a terrific kill of salmon in a day, could it not?

Mr. THOMPSON. It could, certainly.

Mr. PELLY. Other types of seals actually follow the run of salmon?

Mr. THOMPSON. The sea lions and hair seals are fairly well localized in the areas where fish supplies are plentiful, and do eat quantities of fish and also do damage to the fishing gear. The Territorial Department of Fisheries has been working on that problem. They have done some control work at the mouth of the Copper and mouth of the Stikine River.

Mr. PELLY. There are no hatcheries in Alaska?

Mr. THOMPSON. There are none now. The last closed in 1935. There have been none since that time. We do not believe that hatcheries have a place in an area where the water conditions and environment for the natural propagation of salmon is as it is in Alaska.

One of the men who is here to talk about fish hatcheries in the United States proper can answer your question better than I can, but that is the general answer.

Mr. BARTLETT. Could I ask one question there?

The CHAIRMAN. Yes.

Mr. BARTLETT. Mr. Thompson, has the research of the Fish and Wildlife Service proceeded to the point where you are now able to determine whether the Japanese are taking many fish that originate in Alaska streams and would have returned there if they had not been taken by the Japanese?

Mr. THOMPSON. I don't believe any conclusions have yet been reached. That is a project that is underway right now. There is research to answer that question. That is part of the North Pacific Treaty relationship and it will be answered.

Mr. BARTLETT. As you are aware, many Alaska fishermen believe that the Japanese are taking large quantities of what are Alaska fish. Are there any tentative conclusions?

Mr. THOMPSON. None.

Mr. BARTLETT. It may be true, then, that the Japanese are taking Alaska fish and that line may be moved farther westward in accordance with the provisions of the treaty?

Mr. THOMPSON. As soon as that question can be answered—what is the area of intermingling of the Asiatic and American stocks—that line will be adjusted, I am sure.

Mr. BARTLETT. In the meantime, does the Fish and Wildlife Service have any estimate at all of the depradations that might be being made of the Alaska fish?

Mr. THOMPSON. By the Japanese?

Mr. BARTLETT. By the Japanese.

Mr. THOMPSON. No.

Mr. BARTLETT. You have no information at all?

Mr. THOMPSON. We have had observers on those Japanese vessels operating off the Alaskan coast on the high seas, and they are making measurements and studying salmon, but no conclusions have been reached.

Mr. BARTLETT. Thank you.

Mr. THOMPSON. I am sure that I have taken more time than I should with regard to this salmon fishery problem in Alaska and I perhaps can just hit the highlights on this fur-seal work that we do, and for which the Fish and Wildlife Service is responsible.

The fur-seal herd at the Pribilof Islands has been threatened with extinction twice. Once during Russian ownership, and again during American ownership. That came about primarily as a result of the unrestricted taking of seals at sea by small schooners operated by Canadian, American, and Japanese sealers. By 1910 the fur-seal herd had been reduced to a point where there were only 125,090 animals left.

Its original size was estimated to be 2½ million, and it was thought to be almost at that size when it was acquired in the purchase of Alaska.

The pelagic sealers probably found it not profitable to continue with the operation and in 1911 it was possible to secure, through an international agreement between the United States, Russia, Japan, and Great Britain, an agreement to put a stop to all pelagic sealing.

That treaty continued in force until 1941 when Japan gave notice of abrogation.

During that time the fur-seal herd really prospered. It increased in size and through careful management it was possible to harvest only surplus animals.

Probably there is no wild animal at all that lends itself so conveniently to rational management as the fur seal does. It cooperates in every respect. They land only at the Pribilof Islands. Soon after coming ashore the mature females have their young. Those pups, as they are called in spite of the fact that the adult female is called a cow, those pups are almost equally divided in males and females. Yet the animals themselves are highly polygamous. The adult male will have a harem of from 40 to 60 or even more females.

There is a very sizable surplus of males which can be taken for their fur. Those are mostly 3-year-old males. They are immature. They have not engaged in very much fighting yet. The fur is in prime shape and is not marked by scars such as characterize the older bulls.

The fur-seal skins are given a preliminary processing at the islands, the skins are stripped from the surplus animals that are killed; they are washed and cured and barreled and then shipped to a plant in St. Louis for dressing and dyeing and selling. That plant has a contract with the Government to perform that service. They also send a number of men to the islands to supervise this preliminary processing work.

As Dr. Meehean has pointed out, that has been an extremely successful program. The herd has been restored to its original size. It has been at a maximum size now for almost 15 years and during the period of restoration it has yielded almost 2 million fur-seal skins.

The gross return from those skins is about $30 million, and the net about $17 million over and above expenses. We expect a net overall return in connection with the management of the Pribilof Islands this year of $1½ million.

I have here a number of fur-seal skins that you may like to look at. I do not have any samples to give you. The upper part of this skin is natural pelt. The processing, and there are about 100 processes that bring it to a point where it is ready to be made into a garment, includes the removal of the guard hairs, and when that is done this curly underhair shows up.

This is to show the three different dyes that are used. The application of the dyes straightens the fur and gives it a high finish that is now so popular in styles. Here are the three shades that are presently dyed.

I understand that you have already seen the sea-otter skin.

Mr. PELLY. How many sea otters are there?

Mr. THOMPSON. I think the estimate is 8,000. They have been completely protected since 1910. None of them are being marketed.

Mr. Chairman, that completes my statement.

The CHAIRMAN. Thank you very much. It has been very interesting.

Call the next witness.

Dr. MEEHEAN. Mr. Chairman, I would like to introduce Mr. William Hagen, Assistant Chief of the Branch of Game-Fish and Hatcheries, which is an activity that is primarily engaged in the production of fish for the maintenance of sports fisheries, and it devotes a greater

part of its efforts to the production and management of fisheries on Federal lands.

STATEMENT OF WILLIAM HAGEN, JR., ASSISTANT CHIEF, BRANCH OF THE GAME FISH AND HATCHERIES, FISH AND WILDLIFE SERVICE

The CHAIRMAN. Give your full name and background.

Mr. HAGEN. My name is William Hagen, Jr., Assistant Chief of the Branch of Game Fish and Hatcheries. My background is as follows:

I graduated from the University of Washington, School of Fisheries. Following graduation I immediately went with the Bureau of Fisheries and then with the successor agency, the Fish and Wildlife Service.

My work has been in recent years concerned primarily with salmon and with trout. As Assistant Chief of the Branch, I am now concerned with all operations and activities.

Because of the time I hope to run right through my prepared charts in a hurry, hitting the highlights, and I trust that any questions that you gentlemen may have will bring out any points in doubt.

As Dr. Meehean mentioned, the principal activity of the branch is the production of fish. In the United States now we have 89 fish cultural stations producing salmon, trout, and the pondfish species, principally bass, bluegills, some catfish, and a few smallmouth bass.

These fish are distributed to Federal lands primarily or lands under the jurisdiction of the Federal Government, or into waters created by federally sponsored projects.

In the New England States and down into Tennessee we have trout hatcheries producing primarily brook trout and brown trout with a few rainbows.

One activity at Craig Brook in cooperation with the State of Maine has to do with the attempted rehabilitation of Atlantic salmon in Maine streams. Along the northern part of the country we have trout production and in the Rockies primarily rainbow trout with the same species produced out on the coast. All of the coastal stations in the three Pacific Coast States are concerned with the maintenance of the Pacific salmon.

This grouping of hatcheries in Washington and Oregon is primarily on the Columbia River watershed, where, as many of you are aware, we have a problem of maintaining the salmon in face of the construction of Federal and other dams. A little more on that later, if I may.

In the South and Southeast and Southwest and up into the Midwest we have warm-water stations. That is, they produce pondfish for the stocking of federally sponsored projects which includes farm ponds and larger Federal water-use projects.

In order to train our personnel we do have a training school at the Entiat, Wash., station, and Marion, Ala., and another at Cortland, N. Y. Cortland is a research center and also is a hatchery.

We send men to each of these stations for about a year's duration. Those that are most promising, whom we believe will make good superintendents in the future, are trained in the latest techniques. They also work in the routine work while they are there.

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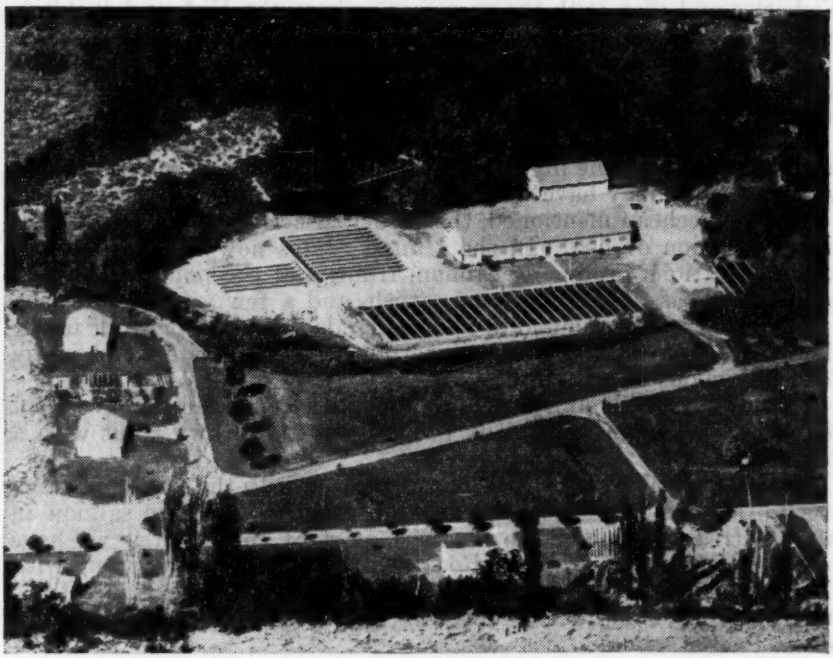
We have found this program to have paid good dividends. It spreads the research findings throughout the country, and it passes from one employee to the other.

I thought you might be interested in seeing a typical trout hatchery. This is located at Hagerman, Idaho. The eggs are taken mostly at Salmon, Idaho, where we take the eggs from wild stock. Other eggs are transferred from brood stock held at other Fish and Wildlife Service installations and State hatcheries. The eggs are placed in the hatchery where they are in running water during the period of incubation. When they hatch and attain a size to be fed they are placed in these ponds. Upon attaining a size for the stocking of waters in the area, they are transported by truck to these waters.



Incidentally, as you may have noticed, the handbook that you have in hand has these same photographs and all of the charts. This is a typical pondfish station where bass, bluegills and other species are reared. Whereas, in the trout we will take the eggs from the female and fertilize them with the male, in the pondfish station. The adults are held from year to year and allowed to spawn in ponds similar to these.

U.S. DEPARTMENT OF THE INTERIOR

UNITED STATES FISH-CULTURAL STATIONS
INDEX OF OPERATIONS

COMPILED IN THE DIVISION OF LAND ACQUISITION

CHICAGO, ILLINOIS SEPTEMBER 1943
REVISED: 44-9/33, 45-1/2, 46/6-46; 47-5/15;50-6/15;51-1/16; 53-7/1;54-7/1

SCALE OF MILES

ULTURAL STATIONS
RATIONS

FISH AND WILDLIFE SERVICE

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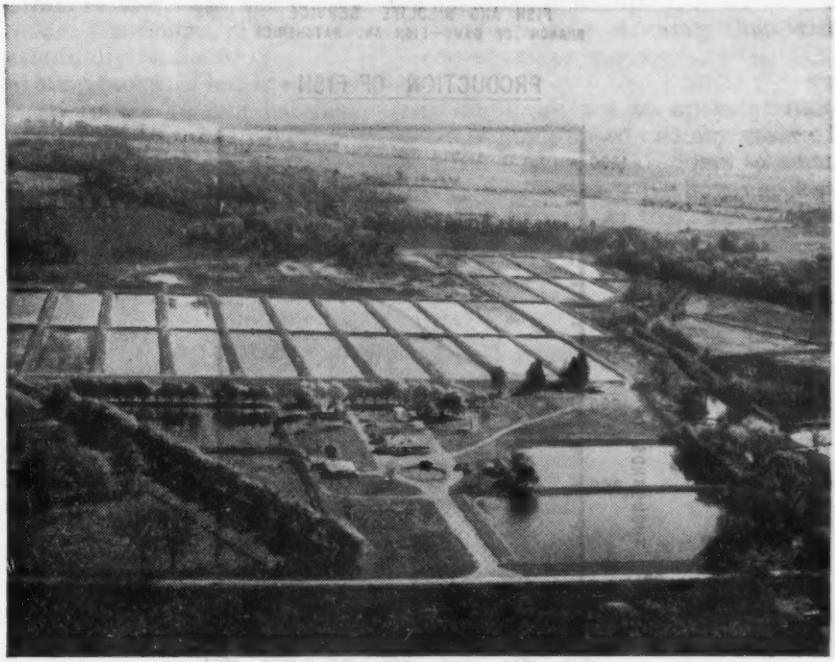
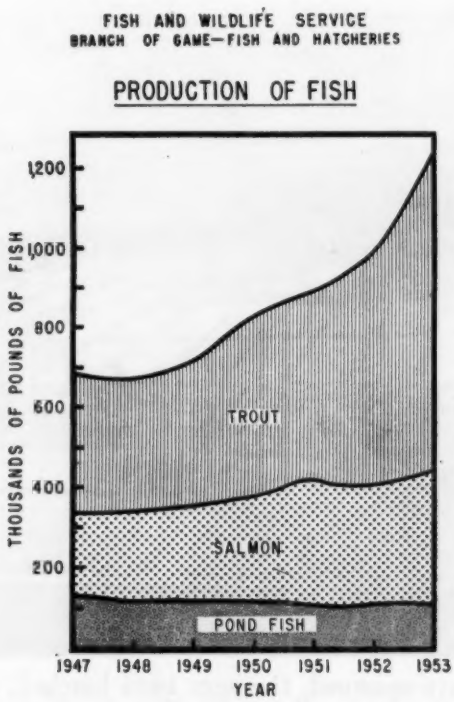


After they have spawned, the eggs have hatched, and before the young fish scatter, very small fish are dipped out of these ponds and placed into these ponds for growth to a size desired for distribution.

You will perhaps notice in the comments in the book that the production at this station last year was only 1,100 pounds of fish. As a matter of fact, about half of this hatchery is now under cooperative use with the State of Ohio for experimental determination of stocking ratios and also to determine the returns to the sport fishermen.

It is planned that some of these ponds will be used for public fishing to determine the better stocking for the best return to the fishermen.

During the period 1947 to 1953 we produced pondfish, salmon, and trout. We have almost doubled our production in that time. For example, in 1953 the total production in pounds of fish, not numbers, was 1,200,000. The pondfish production appears to have dropped off. That is true in pounds, but in numbers of fish it was increased because of our increased knowledge as to the stocking of warm waters with pondfish, and we found that the smaller sizes were just as advantageous in developing populations as the larger fish we had produced previously.



The increase in salmon production over these years is attributable almost entirely to our large development on the lower Columbia River where we are trying to counteract the effects of the dams together with the States of Oregon and Washington. The increase in trout production in pounds can be accounted for largely because in many areas we have such terrific fishing pressure that we must resort to what we call put-and-take fishing. That is, the fish are put into the streams the same year that we expect them to be caught. That is particularly true in the East where so many waters are under private ownership, and the Federal waters are becoming more used by the fishermen.

Mr. VAN PELT. Mr. Chairman, could I ask a question?

The CHAIRMAN. Mr. Van Pelt.

Mr. VAN PELT. Several days ago we had testimony to the effect that they thought the service had now brought under control the lamprey eel in the Great Lakes.

In the chart that you just had there, what are the plans for restocking Lake Michigan?

Mr. HAGEN. We have a plan together with the States in the area that is being set up right now to produce a large number of at least year-old lake trout to be placed in the lakes provided that the Congress provides the money for the maintenance of the lamprey-control program. We have agreed, and the States agree with us, that without continued work on controlling the lampreys in the streams, and the maintenance funds required, there is no point in spending the money to stock the lakes. That is where the situation stands right now.

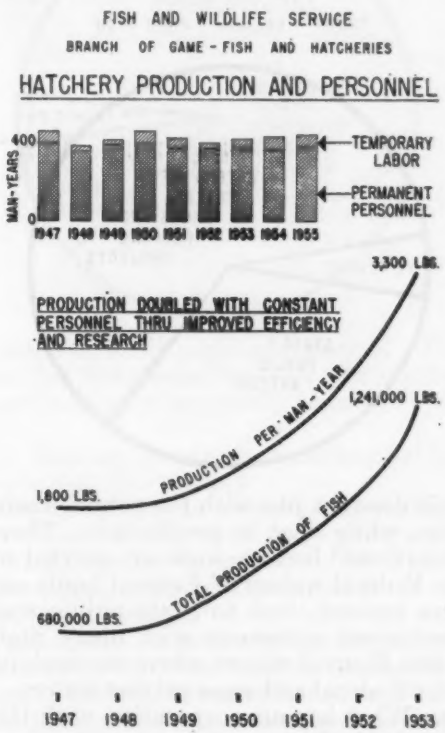
Mr. CEDERBERG. Will that be done in cooperation with Canada?

Mr. HAGEN. Yes, there is a commission being set up.

Mr. CEDERBERG. They will participate in any stocking that will eventually be done.

Mr. HAGEN. That is correct; yes.

To return to our hatchery production, we try to operate these hatcheries in a businesslike way. It is our aim to cut our costs of production and distribution of the stock. We also are alert to what is happening to our fish after they go into the water. We have checked on that and also determined where our fish go so that we are not stocking indiscriminately.



You will notice from this chart that our permanent and temporary personnel over the years 1946 to 1955 has remained fairly constant. We have not built up a stock of personnel of any greater number than we had to begin with.

About 400 man-years are employed in our hatcheries. At the same time, that is from 1947 to 1953, we have doubled our production per man, which might imply that we have made these people work twice as hard. It is not entirely that. The research techniques and improved equipment and improved facilities provided by the Congress have permitted us to produce more per man. That came about when we doubled our production during those years in all phases.

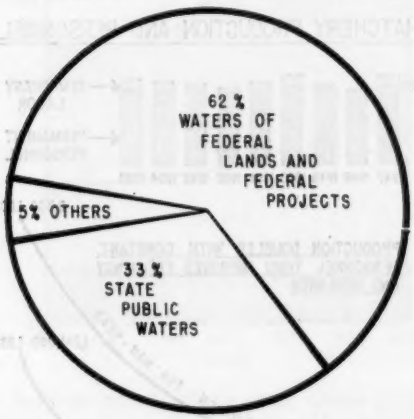
Actually in the salmon and trout work, where we have better control over fish in the ponds and we feed them, many of the stations have 10 and 15 and even up to 17 thousand pounds production per man-year.

We have a policy concerning the distribution of our fish in pounds of trout, salmon, and pond fish, as you may note in your handbooks. All Federal waters are stocked and then State waters, and if we have any surplus fish they are available for stocking into some private waters.

FISH AND WILDLIFE SERVICE
BRANCH OF GAME—FISH AND HATCHERIES

DISTRIBUTION OF FISH PRODUCED IN 1953

1,175,000 POUNDS
TROUT - SALMON - POND FISH



Incidentally this does not jibe with the pounds there because this is actual distribution while that is production. There can be more produced than distributed because some are carried over. Sixty-two percent went into Federal waters of Federal lands and Federal projects. Thirty-three percent went to State public waters. However, there is also a reciprocal agreement with many States whereby the State may stock into Federal waters where we stock into their waters. The 5 percent is for Federal and some private waters.

The CHAIRMAN. What is your cooperation with this program that the Department of Agriculture promotes in private ponds?

Mr. HAGEN. We are very often afraid that the stocking of fish and the production of fish in those ponds is one of the reasons why they build the ponds. However, we do stock thousands of ponds, farm ponds. They are small.

The CHAIRMAN. To what extent do you stock them?

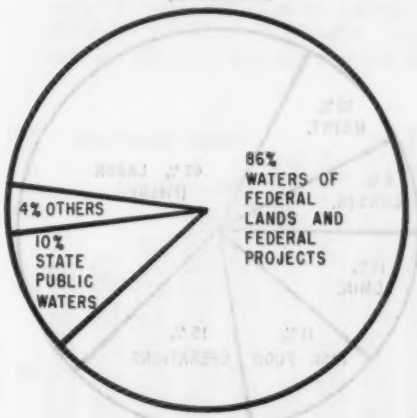
Mr. HAGEN. We will put the initial stock in and advise the owners that they should fish them and how to manage those ponds. We usually do not stock them every year, but after we stock them once with two species, that is bass and a prey species, we expect that the population will maintain itself.

It is the initial stocking with which we are concerned. We are glad to do that. It is a federally sponsored project and also takes the fishing pressure off other public waters.

FISH AND WILDLIFE SERVICE
BRANCH OF GAME-FISH AND HATCHERIES

DISTRIBUTION OF FISH PRODUCED IN 1953

186 MILLION FISH
TROUT - SALMON - POND FISH



This, for your interest, is the same information. This is in number of fish, 168 million fish distributed in 1953. In numbers, many more go into Federal and less into State public waters. That is in numbers of fish.

The CHAIRMAN. You say you are cooperating in this pond project. How much have you put into ponds?

Mr. HAGEN. How many fish do we put in annually?

The CHAIRMAN. Yes. It is getting to be quite a program all over the country. It is helping the water table in the plains country and is also providing recreation, diversification, and food. I am interested to know just what you are doing.

Mr. HAGEN. I am afraid we cannot give you the number of ponds, but through the years they have run into the thousands. It is about 60 million in numbers of fish which were planted in 1953.

The CHAIRMAN. Into what States were those put?

Mr. HAGEN. All the States through the South up into the Middle West. That was not in the Northwest to any extent, nor in the Rocky Mountains or Pacific coast areas but just the South, Southwest, and Middle West.

I thought you might be interested in what we do with our money. As I said, we try to operate on a businesslike basis. We have our labor. We have our materials and fish food, and we have certain expenses, administrative and operations, and we have a maintenance cost. We come out with an end product and each year we have been reducing the cost, getting more for the dollar despite the fact that prices have been going up all the time. That is primarily because of our improved facilities and improved equipment.

FISH AND WILDLIFE SERVICE
BRANCH OF GAME, FISH AND HATCHERIES

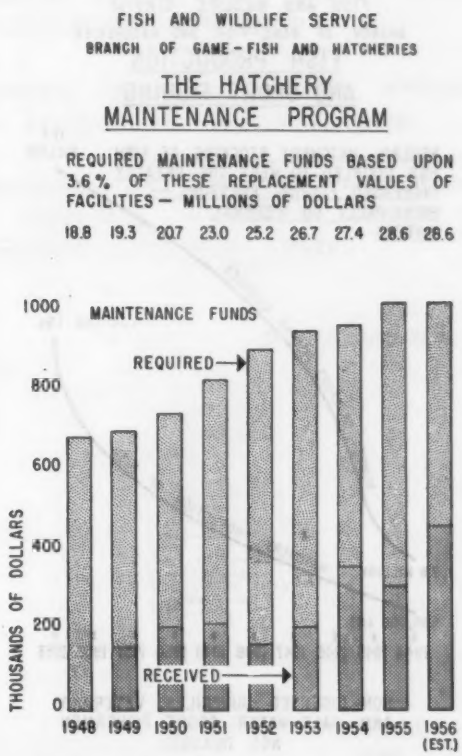
DISPOSITION OF
1955 APPROPRIATION

$2,925,000

In one field of financing, however, we are a little short. Here I have tabulated some information that we derive from recognized sources, that is Government agencies that have determined what upkeep and maintenance should be provided for certain facilities.

In the instance of our hatchery installations, our pond fences, lands, and equipment, it is determined that 3.6 percent of the replacement value should be provided each year for upkeep and maintenance. In other words, in 1949 we had a replacement value of all facilities of $18.8 million. It is today $28.6 million.

Here are the maintenance funds that should have been received or should be received in relation to a recognized basis of calculations. These are the figures that were actually received and this is our current budget request.



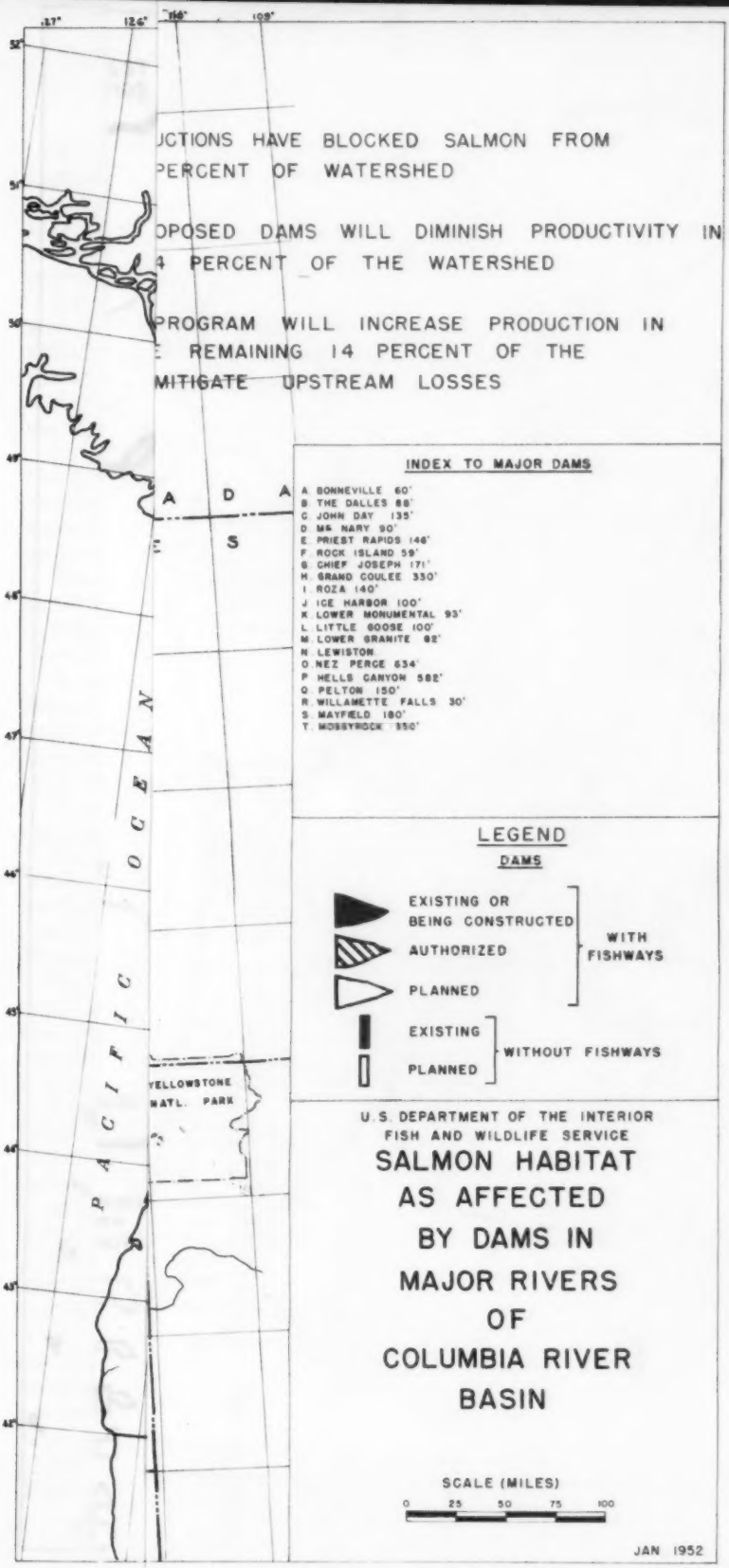
To go back to production again, and one of the prime reasons why we have increased our production and feel that we are still not keeping ahead of the fishing pressure, in 1944 there were 7.8 million sport-fishing licenses sold, not including the nonlicensed juveniles, veterans, and salt-water sport fishermen. That figure in 1944 has grown to 17.7 million in 1953, and figures released in the last few days puts it at 18.5 million in 1954.

FISH AND WILDLIFE SERVICE
BRANCH OF GAME-FISH AND HATCHERIES
FISH PRODUCTION
AND SPORT FISHING
FEDERAL HATCHERY STOCKING OF FISH HAS DOUBLED TO MEET THE GREATLY INCREASED FISHING PRESSURE — PRINCIPALLY ON FEDERAL WATERS
17.7 MILLION
NUMBER OF SPORT FISHING LICENSES
1,241,000 LBS.
HATCHERY PRODUCTION OF FISH
7.8 MILLION
550,000 LBS.
1944 1945 1946 1947 1948 1949 1950 1951 1952 1953
NON-LICENSED JUVENILES, VETERANS AND SALT-WATER SPORT FISHERMEN NOT INCLUDED

We have increased our production primarily for the reason that we are stocking Federal waters, national forests, national parks, and that is where many of these fishermen go. In the East particularly, as I have said, private waters can be found all over the East. These additional fishermen must then go on to Federal waters, the national forests. We do our best to provide the fish for them and maintain the populations.

In that regard we feel that natural reproduction should be counted upon first to provide the fish. If the fishing pressure is slight, natural reproduction probably can take care of it. If it is heavy, then the sportsmen and fishermen, having paid their money and expecting a stocking on Federal waters, require a stocking of fish. We do all our stocking on Federal areas in cooperation with the Federal agency having jurisdiction.

One other subject that I would like to discuss briefly is the Columbia River fishery development program. I do not have a map of that. However, in the back of your handbook there are two maps. Through the years the Federal Government, starting with Bonneville Dam and going to Grand Coulee Dam, has constructed these dams for various uses, primarily power and irrigation. It was contemplated that many additional dams would be constructed by the Federal Government or others in the watershed.



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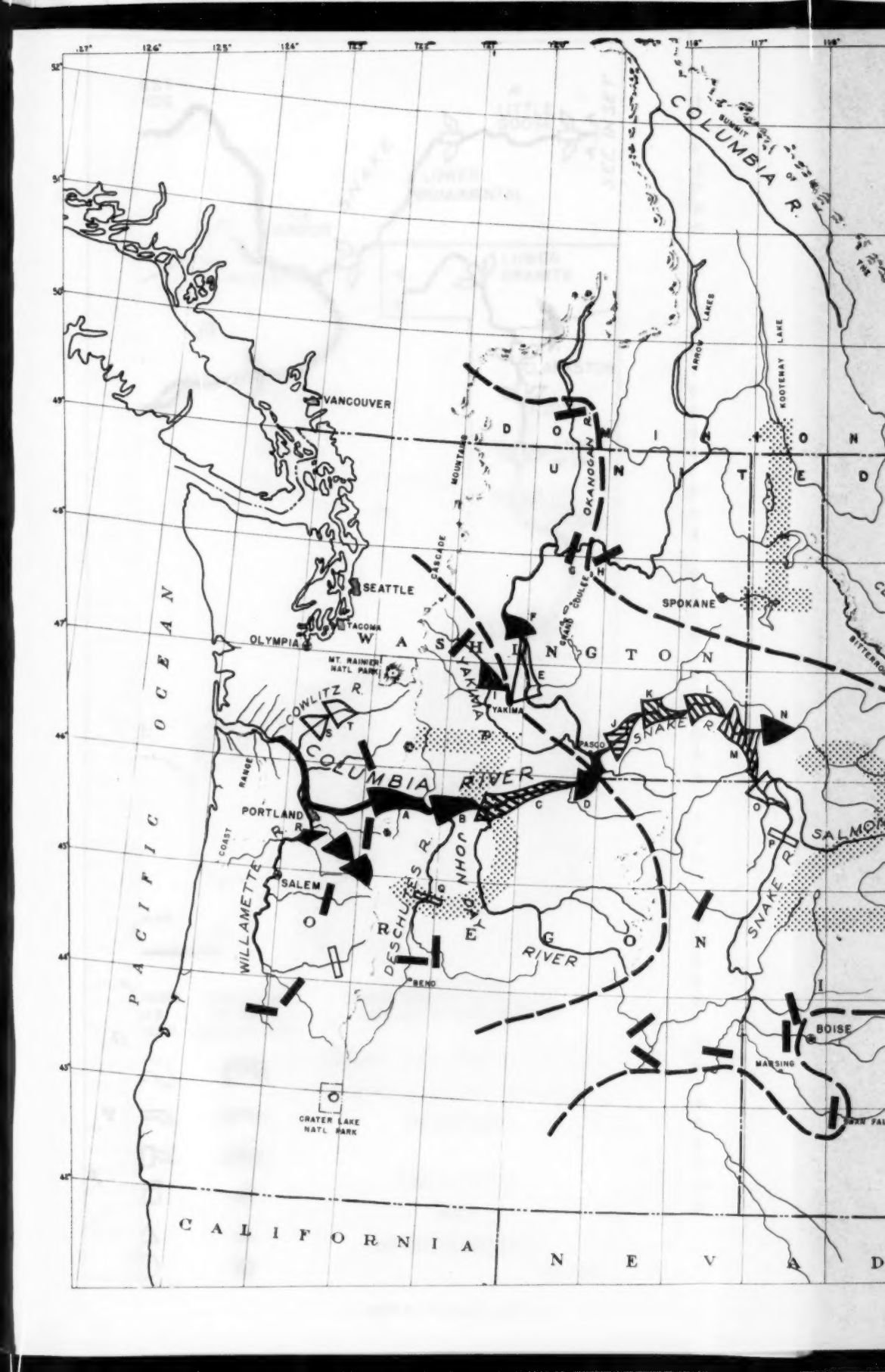
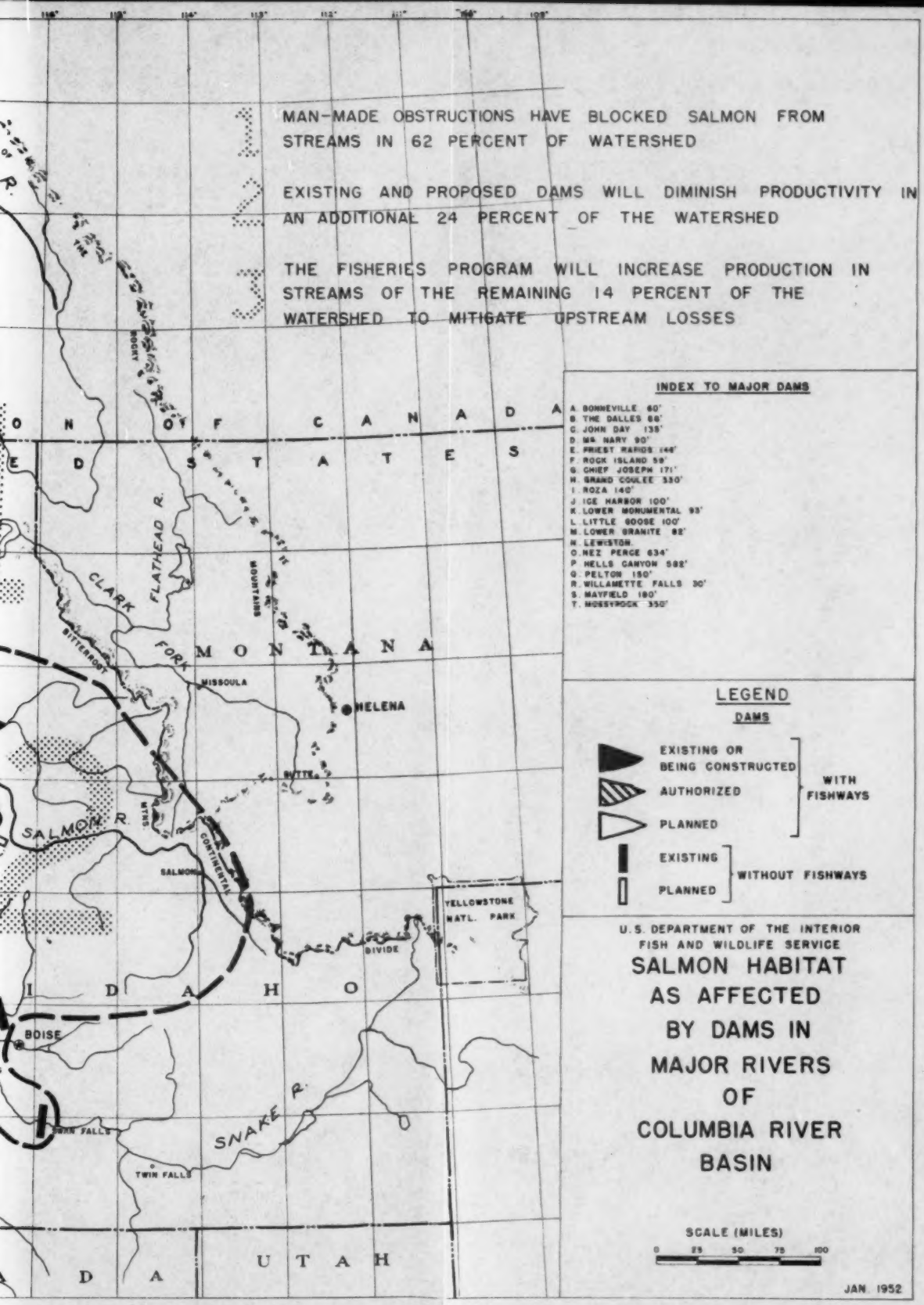

COLUMBIA R.
VANCOUVER
SEATTLE
TACOMA
OLYMPIA
MT. RAINIER NATL. PARK
COWLITZ R.
YAKIMA
SPOKANE
COLUMBIA RIVER
PORTLAND
SALEM
WILLAMETTE R.
DESCHUTES R.
JOHN DAY RIVER
BEND
CRATER LAKE NATL. PARK
SNAKE R.
PASCO
BOISE
PACIFIC OCEAN
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
OKANOGAN R.
KOOTENAY LAKE
CASCADE MOUNTAINS
COAST RANGE



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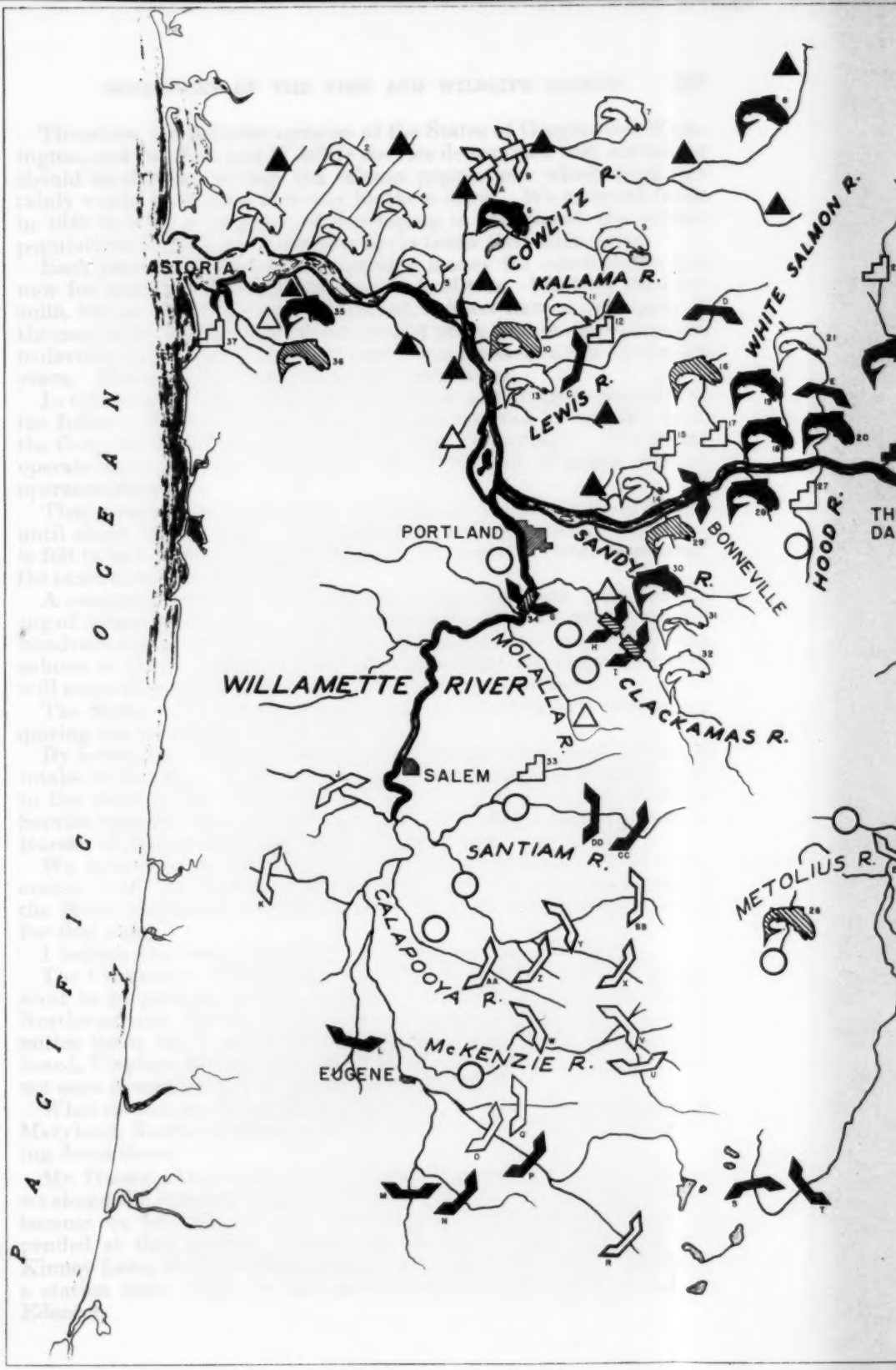
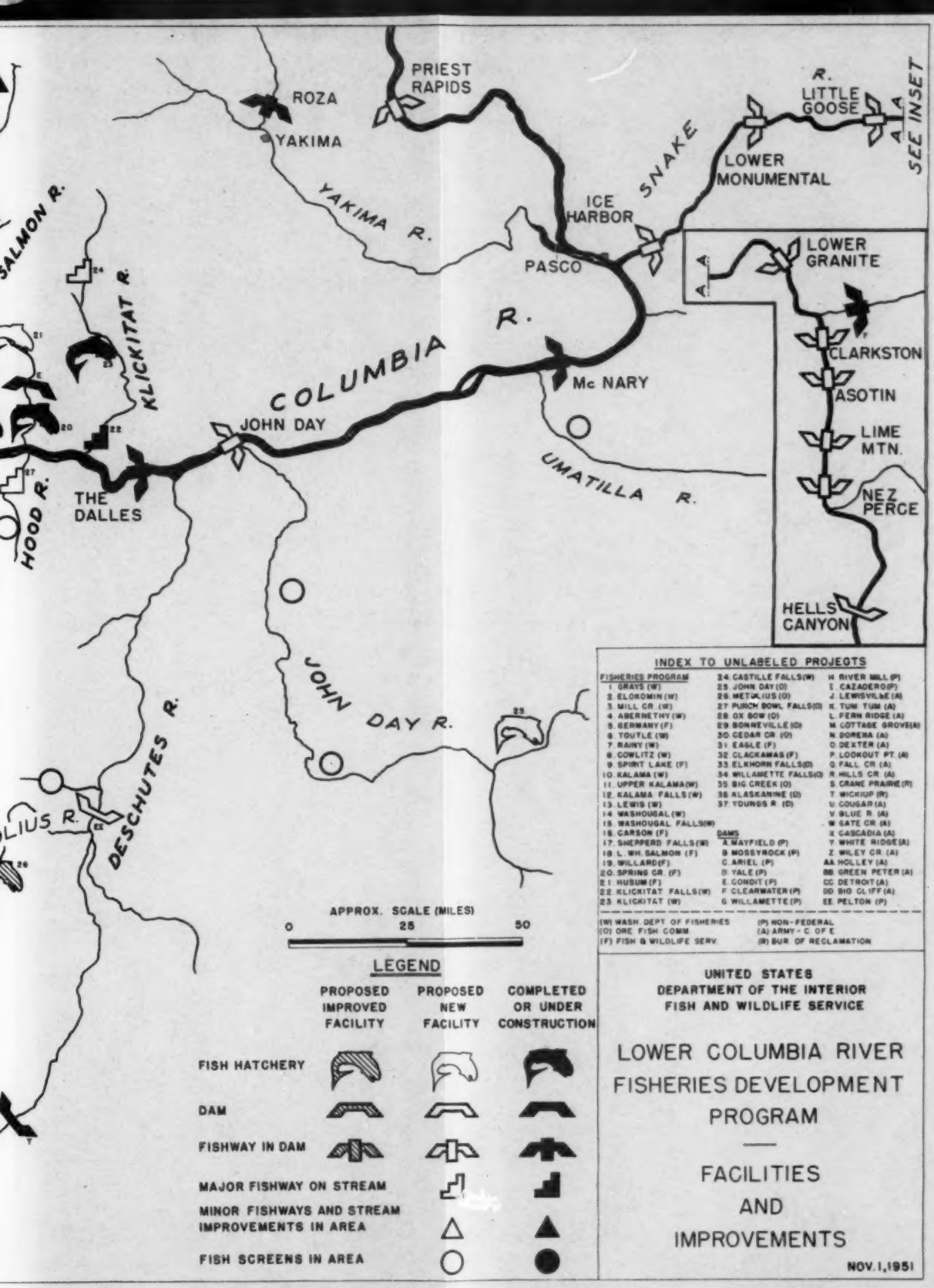

PACIFIC OCEAN
ASTORIA
COWLITZ R.
KALAMA R.
LEWIS R.
WHITE SALMON R.
PORTLAND
SANDY R.
BONNEVILLE
HOOD R.
WILLAMETTE RIVER
MOLALLA R.
CLACKAMAS R.
SALEM
SANTIAM R.
METOLIUS R.
CALAPOOYA R.
McKENZIE R.
EUGENE



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2. ELOKOMIN (W)	25. JOHN DAY (O)	I. CAZADERO (F)
3. MILL CR. (W)	26. METOLIUS (O)	J. LEWISVILLE (A)
4. ABERNETHY (W)	27. PUNCH BOWL FALLS(O)	K. TUM TUM (A)
5. GERMANY (F)	28. OX BOW (O)	L. FERN RIDGE (A)
6. TOUTLE (W)	29. BONNEVILLE (O)	M. COTTAGE GROVE(A)
7. RAINY (W)	30. CEDAR CR. (O)	N. DORENA (A)
8. COWLITZ (W)	31. EAGLE (F)	O. DEXTER (A)
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17. SHEPPERD FALLS (W)	A. MAYFIELD (P)	X. CASCADIA (A)
18. L. WH. SALMON (F)	B. MOSSYROCK (P)	Y. WHITE RIDGE(A)
19. WILLARD(F)	C. ARIEL (P)	Z. WILEY CR. (A)
20. SPRING CR. (F)	D. YALE (P)	AA. HOLLEY (A)
21. HUSUM (F)	E. CONDIT (P)	BB. GREEN PETER (A)
22. KLICKITAT FALLS(W)	F. CLEARWATER (P)	CC. DETROIT (A)
23. KLICKITAT (W)	G. WILLAMETTE (P)	DD. BIG CLIFF (A)
		EE. PELTON (P)

(W) WASH. DEPT. OF FISHERIES
(O) ORE. FISH COMM.
(F) FISH & WILDLIFE SERV.
(P) NON-FEDERAL
(A) ARMY - C. OF E.
(R) BUR. OF RECLAMATION

LEGEND

	PROPOSED IMPROVED FACILITY	PROPOSED NEW FACILITY	COMPLETED OR UNDER CONSTRUCTION
FISH HATCHERY			
DAM			
FISHWAY IN DAM			
MAJOR FISHWAY ON STREAM			
MINOR FISHWAYS AND STREAM IMPROVEMENTS IN AREA		△	▲
FISH SCREENS IN AREA		○	●

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

LOWER COLUMBIA RIVER FISHERIES DEVELOPMENT PROGRAM

FACILITIES AND IMPROVEMENTS

NOV. 1, 1951

59878 O - 55 (Face p. 230) No. 2

ASTORIA
COLUMBIA
WILLAMETTE RIVER
SALEM
EUGENE

Therefore, the fisheries agencies of the States of Oregon and Washington, and the Fish and Wildlife Service determined that something should be done to salvage the salmon populations which most certainly would be injured seriously by these dams. We received funds in 1949 to start a program of developing to the utmost the salmon populations in the lower Columbia River below the major dams.

Each year the Congress has provided money for construction and now for operation and maintenance of facilities. We have some results, but as Mr. Thompson explained, salmon have a life cycle in the case of the Columbia River of about 4 years, and we cannot expect to develop the populations in that area in much less than 8 or 12 or more years. However, the prospects are very promising.

In this program the States of Washington and Oregon cooperate to the fullest. We provide the funds that are received by transfer from the Corps of Engineers for the construction of facilities. The States operate some of those facilities. The Fish and Wildlife Service operates others.

That program is expected to continue in its construction phases until about 1960 or 1961. The operation and maintenance however, is felt to be a Federal responsibility for a number of years thereafter, the exact time to be determined.

A companion activity in the Northwest in particular is the screening of irrigation diversions. In the Columbia Basin there are literally hundreds and hundreds of irrigation diversions down which the young salmon in their migration to the sea have often wandered and they will enter these diversions and enter on the farmer's fields.

The States of Washington and Oregon have taken the lead in requiring the screening of these diversions.

By screening I mean revolving drums or some devices placed at the intake of the canal which stops the salmon and they are diverted back to the main stream by a pipe or channel. The Fish and Wildlife Service operates 12 of the largest screens on Federal projects; that is, Bureau of Reclamation and Indian Service water-use projects.

We have also, on the Delta-Mendota Canal in California, in cooperation with the Bureau of Reclamation and with the assistance of the State, developed an entirely new type of fish-screening device for that canal.

I believe that that concludes my testimony, Mr. Chairman.

The CHAIRMAN. Would you bring back that first chart? I do not want to be personal in this matter. I am interested in the Pacific Northwest and Pacific coast. We have fine members of the committee there, but I am a little interested in the South Atlantic seaboard, Virginia, Maryland, and my State of North Carolina, and I do not seem to see that you do much down that way.

What do you do, if you do anything, in the way of replenishing in Maryland, North Carolina, and Virginia? Tell me what you are doing down there.

Mr. HAGEN. As you are aware, because we have had correspondence, we closed the Edenton station. We discontinued our operations there because we felt that we were not doing enough with the funds expended at that station, whereas the Harrison Lake, Va., and McKinney Lake, N. C., could serve that area quite adequately. We have a station there which is now serving the area formerly served by Edenton.

The CHAIRMAN. You built a new station and closed an old one?

Mr. HAGEN. This has been in operation for a short time. That is approximately what was done. Both these stations, Harrison Lake and McKinney Lake, are relatively new stations.

The CHAIRMAN. What do they produce?

Mr. HAGEN. They produce warm-water species.

The CHAIRMAN. Do you do something for rockfish or striped bass?

Mr. HAGEN. We do not work with striped bass. It has been found that artificial production of striped bass has not been profitable. I believe the State of North Carolina is investigating some artificial system at the present time.

The CHAIRMAN. Are you doing anything in the State for striped bass?

Mr. HAGEN. Our hatchery branch is not doing any study work because we are not the research section.

The CHAIRMAN. From a national standpoint, are you doing anything in that area for the development or propagation or increasing the striped bass in the Chesapeake or Carolina area?

Dr. MEEHEAN. Mr. Chairman, there is a very extensive program of investigations going on at the present time which the Fish and Wildlife Service is heading up. The Atlantic States Marine Commission and the Gulf States Commission, composed of the States, are cooperating with the Fish and Wildlife Service in an investigation of the rockfish along the Atlantic coast. Each of the States has some segment of that program and the Service has a segment of it and all of that work is being coordinated through these new commissions which you will hear about next week. It is a research program to determine something about the life history, the migration, how to manage that fishery, whether hatcheries will be needed or are effective, all of those things to be determined.

The CHAIRMAN. You are going to discuss that?

Dr. MEEHEAN. That will be discussed under the operation of those commissions.

The CHAIRMAN. That will be Tuesday of next week.

Dr. MEEHEAN. Thank you.

The CHAIRMAN. Will you tell me why you closed that Edenton station and built the other station?

Mr. HAGEN. We had operations in southern North Carolina as well as in Harrison Lake.

The CHAIRMAN. You had a going function there; buildings, funds, and so on. You closed that.

Mr. HAGEN. It was essentially a shad station to begin with; that is, for the propagation of shad; which we discontinued as it apparently was not beneficial to the runs. Therefore, we turned it over to pondfish production. However, we felt that it needed so much construction——

The CHAIRMAN. You spent a lot of money there during the PWA and WPA days in building new ponds.

Mr. HAGEN. That is right, sir. We found that we could produce better at McKinney Lake and Harrison.

The CHAIRMAN. Why?

Mr. HAGEN. They were better constructed stations with a better water supply.

The CHAIRMAN. They were new stations.

Mr. HAGEN. They were new at that time.

The CHAIRMAN. You could have put the money into this one.

Mr. HAGEN. Our water supply was much better at those locations.

The CHAIRMAN. What type?

Mr. HAGEN. At Harrison Lake we have water from a lake and at McKinney Lake also we have lake water.

The CHAIRMAN. This station was the natural water of this particular fish.

Mr. HAGEN. Of the shad that we were working with.

The CHAIRMAN. And the bass and bluegill and so forth.

Mr. HAGEN. Our water supply there was not, for our purposes and for rearing fish in ponds, as adequate as was the water at these places.

The CHAIRMAN. There is just more water than there is anything else there?

Mr. HAGEN. We would have had to, as I started to say, reconstruct the whole station in recent years.

The CHAIRMAN. All right, sir.

Mr. Allen?

Mr. ALLEN. Mr. Hagen, when did you attend the University of Washington?

Mr. HAGEN. I left the University of Washington in 1932.

Mr. ALLEN. You may be able to answer a question about which I have been wondering.

You hear a great many claims for the credit of advancing the science of fisheries coming from industry and coming from the State institutions, and also from the Federal institutions. I wonder if you could appraise the proportion in which the various levels contribute to the whole fund of knowledge, both in money and in the actual accomplishment?

Mr. HAGEN. I wonder if I gathered just what you mean.

Mr. ALLEN. Maybe it is not a fair question to ask. I do think you have the experience in one of the finest fishery schools possibly in the world, and in a state that has done a lot for its fisheries. The salmon industry there claims a lot of credit for the progress which it has made and which it has as an industry paid for and developed. Of course, Fish and Wildlife is rather proud of its accomplishment. Who contributed most?

The CHAIRMAN. I think these have been splendid gentlemen and I think the Pacific coast has done well to produce them. I do want them to show a little interest in my part of the country. I have very patiently listened to the fish life and wildfowl life all over the rest of the United States. But I have not heard much from my section. I do not want to be personal, but I do think I have a right to ask if you were doing anything there and what you were doing.

Mr. HAGEN. Did I answer your question, sir?

Mr. ALLEN. Can you give me an idea of how much of the research comes from the industry; how much comes from the State institutions?

Mr. HAGEN. I am afraid I cannot in the overall. However, the industry in the Northwest has been active for many years and even when I was in school I know the industry was very much interested in the school and was suggesting courses and setting up scholarships.

That is a number of years ago and they have now set up in the salmon work a research foundation also.

Mr. ALLEN. Have you any idea how much money the salmon industry spends on research annually?

Mr. HAGEN. I cannot answer that; Mr. Thompson, do you have any idea?

Mr. THOMPSON. I cannot tell you, Mr. Allen. It is a very sizable sum and has been more. During the more profitable years the salmon fishery of Alaska plowed back into research through the University of Washington School of Fisheries a sizable sum, considerably more than the Fish and Wildlife Service had with which to carry on research in the Alaska area.

Mr. ALLEN. Then these figures that you gave us in dollars do not indicate all of the research and development being carried on by quite a sizable amount?

Mr. THOMPSON. No, sir; it does not. It does not reflect either the industry or the Territorial expenditure.

The CHAIRMAN. Mr. Bland, of Virginia, the former chairman of this committee, passed in the Congress a bill to study the shad in the Chesapeake and North Carolina waters. What was accomplished? There was money appropriated for that.

Mr. THOMPSON. May I ask Dr. Meehean to answer that? I am not familiar with that.

Dr. MEEHEAN. I am not entirely familiar with that particular subject. I do know that there were considerable investigations underway all the way from the Hudson River down to Florida. Some of those investigations are still being conducted under these commissions that have been set up and the studies are being coordinated by the Fish and Wildlife Service.

The CHAIRMAN. When you come on Tuesday give us, for the record, some information on what was done and if any results were accomplished.

Dr. MEEHEAN. We will do that.

The CHAIRMAN. Are there any other witnesses today?

Dr. MEEHEAN. I have one additional witness.

The emphasis in this hearing will change because the next activity of the Service that will be discussed is that of controlling predatory animals and rodents. The authorizing legislation was Public Law 776 of the 71st Congress.

Under the provisions of this law, the Secretary of the Interior is authorized and directed—

to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory, or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jack rabbits, and other animals injurious to agriculture, horticulture, forestry, animal husbandry, and wild game animals; and for the protection of stock and other domestic animals through the suppression of rabies; and to conduct campaigns for the destruction or control of such animals.

Mr. Dorr Green is the Chief of the Branch of Predator and Rodent Control, and will tell you about the program.

STATEMENT OF DORR D. GREEN, CHIEF, BRANCH OF PREDATOR AND RODENT CONTROL, FISH AND WILDLIFE SERVICE

Mr. GREEN. Mr. Chairman.

The CHAIRMAN. Will you give your full name and background?

Mr. GREEN. My name is Dorr D. Green. I am a graduate of the Oregon State College at Corvallis, Oreg. I have been engaged in predator and rodent control activities for the Fish and Wildlife Service for slightly more than 35 years. The work in predator and rodent control of the Fish and Wildlife Service might be termed conservation in reverse. In other words, our problem is to protect the natural resources of the country from depredations of wildlife.

To do that means that action must be taken toward preventing damage by several hundred species or subspecies of wild animals. Our activities probably affect more people nationally than any other activity of the Fish and Wildlife Service.

For instance, we are all food consumers and animals have a direct bearing on the production, marketing and preservation of our food. We probably represent a very outstanding cooperative activity between government and industry.

Engaged in this work throughout the United States and Alaska there are approximately 760 full-time employees. One hundred twenty-five of those are paid by the Federal Government. That is a little more than half the number that were paid from Federal appropriations some 10 years ago. This activity is headed here in Washington by three men: myself and an assistant and a technical assistant. We have the aid of 3 stenographer-clerks, and 1 administrative assistant, for a total of 7 in Washington.

Six hundred and thirty-five of the seven hundred and sixty people are paid by cooperating agencies. I mean by "cooperating agencies," State governments, county governments, livestock associations, direct mill levies as high as 25 mills on the dollar of assessed valuation on sheep in certain States, farmers organizations, city governments, et cetera.

We have cooperative written agreements with 34 State agencies in 34 different States. During the fiscal year 1954 cooperating agencies provided a total of $4,418,000 for this program. The Federal Government through an appropriation provided that year $929,000. In the present fiscal year it is $920,000. The ratio of cooperative money to Federal money is $4.75 of cooperative funds to $1 of Federal money. That was fiscal year 1954.

The CHAIRMAN. How do you get your cooperative funds? How are they gathered?

Mr. GREEN. Well, legislatures in many of the States particularly in the West provide direct State appropriations. Some of the money in those States comes through the State game and fish departments who apportion some of their funds for predator control work, particularly to protect game species. Other funds come through State legislation levying special taxes on livestock. That brings the money through county channels to the State treasury. Associations of livestock people assess themselves for work particularly in predatory animal control and in some cases small groups or even individuals dig down in their own pocket and put up money to get work done that they need.

Our part of the program has in the past provided considerable help on the public lands, Forest Service lands in the public domain and in addition to that to correlate and organize the overall program so that there is no overlapping of work being done by one agency as against another, and we have been really remarkably successful in that approach and the program throughout most of the States is one program regardless of where the money might come from to run it. We have in that way avoided a lot of duplication and overlapping.

The different animals with which we deal run from this wolf which was taken in South Dakota to this little mouse, and there are many, many different species and subspecies in between those two.

The most destructive animal or group of animals that we have in the United States is not this wolf. It is this mouse and the rat species that are associated with mice. This is our No. 1 problem. It affects every person in the country, and a few years back the Food and Drug Administration of the Department of Health, Education, and Welfare conducted a long study to determine what might be done or what the situation was as to rodent filth in our raw grain supplies. About two and a half years ago they inaugurated a seizure program for wheat that subsequently was suspended, just exactly why I do not know, but it was suspended and only reinaugurated on January 5 of this year.

The basis for wheat seizure by Food and Drug inspectors at this time is that wheat shall be diverted from human food channels if it contains more than two rodent pellets per pint sample. They also seize it for insect contamination but that is not a part of Fish and Wildlife Service work. It comes in the Department of Agriculture.

A pair of rats living in our grain supplies produce that much urine every day, and a great deal of that in grain storage falls on the grain itself. In addition to the urine that they deposit, they deposit some 140 pellets each day and a great amount of that goes to market with the grain.

A pair of mice, like this housemouse, will deposit that many pellets in a week's time. In addition to that each rat for instance will shed approximately 1 million hairs every year, and it is surprising how difficult it is to keep or to get hair out of food supplies.

In a Minneapolis office building occupied by one of the milling concerns in the city which was vitally interested in the sanitation of their grain products, they actually collected samples of air on the tenth floor of that building that contained a surprising number of hair fragments. It is almost impossible to keep hair fragments out of our food supply.

We just recently learned this week that in the State of Ohio there were 128 bin sites where the Government stored the grain on which it had made loans. One of our men from Purdue University inspected 33 of these bin sites, and this is what he found: that 7 of those bin sites were heavily infested with rats and mice. Eleven had medium infestation and eight had light infestations. Only 6 of the 33 inspected were free of rats and mice living in the area.

We also understand that since the Food and Drug Administration inaugurated their inspection program on wheat that the Department of Agriculture has diverted several carloads from food channels to livestock feed channels because of the rodent contamination that the shipments contained. This is a problem to me that is going to need a

great deal more attention particularly if further advancement is to be made in the cleanliness of our food supplies.

The Food and Drug Administration, of course, is responsible for the enforcement of food sanitation requirements. We have no enforcement authority whatever. Our only interest in this subject is to be helpful in obtaining results for the improvement of food sanitation. Personally, I do not like to talk about grain sanitation. I like to talk about food sanitation, which is a much wider subject. We have an invitation at the present time to appear before the Dried Fruit Growers Association in California to discuss their rodent problems in connection with the production and processing of dried fruits.

The problem is terrific. It affects every community in the country. It is a problem that too little is being done about at the present time. It is true that there are many agencies doing some work on rat control, particularly city health departments from the standpoint of health alone. But the economic loss from rodents, what we term domestic rodents, rats and mice throughout the United States is a terrific bill and it is of long standing and there should be, in my opinion, a very definite program to improve that situation.

One of our other problems is entirely different in nature. It concerns mice also, but not in buildings. It is the reforestation problem, particularly in our Northwestern States and in our Southern States where it is practically impossible to direct-seed forest trees and have them grow before mice and other rodents consume the seed. It is the one limiting factor above all others that keeps down the amount of acreage that can be reforested with available seed supplies and other facilities for doing the work.

The lumber companies, such as the Long-Bell, the Weyerhaeuser, Crown Zellerbach, and Olympic Tree Farms in Washington, and the State and national forest services are vitally concerned with this rodent problem.

As an example of the improvement that can be made, the economics in the problem of planting alone is enormous. By properly controlling mice on an area to be reforested you can avoid the great expense of reforesting that area by the planting of seedlets grown in a nursery. Savings as much as $10 to $15 an acre for reforestation can be realized as against the planting of trees.

There is, however, an unsolved problem in connection with this matter—we have found it most difficult to keep mice away from seeds distributed from helicopters or airplanes long enough to permit that seed to germinate. You can kill the mice down so that they will not take all the seed, but before that seed sprouts the next spring the mice are back and there is considerable study needed to work out a program that will last a sufficient length of time to let the seeds germinate and start.

Other rodent problems that we have are concerned with mice in orchards which is another mouse problem. Again the mice there are of two species, the meadow mice and the pine mice that actually girdle the trees either above ground or girdle the roots below ground, and we have instances on record where they have actually killed 75 percent of orchard trees as old as 15 years.

The pocket gopher problem on the national forests is a major one. The Forest Service has been attempting to bring back some of their

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livestock ranges, particularly in the mountainous areas of the West and they find that the pocket gophers will not let the range come back, will not let the native vegetation come back as it should because the pocket gophers keep it cut down.

We have a method for controlling pocket gophers, but the method is more expensive than the benefit that might be derived from its application. In other words, it costs too much money to take the pocket gophers off of low value ranges to allow those ranges to come back.

In irrigated areas it is an entirely different problem because there the cash crops are of sufficient value to justify the application of expensive methods.

We also have problems with jack rabbits, prairie dogs, ground squirrels, kangaroo rats, and those problems are particularly pertinent in the drier areas of the Western States. Ground squirrels are known carriers of bubonic plague, which has been discovered by the United States Public Health Service in each of the 11 Western public land States and in North Dakota. How dangerous the plague in field rodents may be, I am not able to say, but I can say that there have been a few human cases of plague in recent years.

Disease in wild animals is an important factor in predator and rodent control activities. For instance, rabies in wild animals is probably at an all-time high in the United States at this time. The covote is a carrier of rabies as well as foxes, skunks, bats, and any other warm-blooded animal that may be in the area. It is particularly prevalent from the Plains States eastward with the exception of New England, which is relatively free of rabies in the wild.

Two years ago or three years ago in Pennsylvania they had quite an outbreak in the eastern part of the State and requested assistance from the Fish and Wildlife Service in stamping it out, and we provided men from Arizona and Wyoming who had had experience with rabies control in coyotes, and we detailed those men to Pennsylvania to train the employees there of the Pennsylvania Game Commission. We have also cooperated with the rabies control among wild animals with the Governments of Canada and Mexico.

In our predator animal control work this wolf here is known as the custer wolf. It was taken in western South Dakota. It had a long record. This is an old skin, an old specimen taken October 11, 1920. He killed more than $25,000 worth of cattle in 1920 currency before his capture. The local people in the area tried to capture him for some 5 years. They asked for help from the Government. We sent in a hunter and it took the hunter 4 years more. During that time he caught him twice in steel traps. He got away. He came near getting shot on several occasions, but he was finally trapped.

At this time the gray wolf in the continental United States is really not important. A few occur in Michigan, Minnesota, Wisconsin, with once in a while one in North Dakota, a few in Oregon, and a few occasionally come across the border from Mexico. But in eastern Texas, Louisiana, Arkansas, and Missouri, we have another wolf known as the red wolf. It is considerably smaller than the gray wolf, and it occurs in considerable numbers throughout that area.

Our real problem in predator control has for a number of years been the coyote. This is not a very good sample, but it happens to be one from western Nebraska. We have taken since 1915 more than

2,600,000 predator animals by known count, and that includes the wolf, the coyote, the bobcat, the stock-killing bear, and the mountain lion. That figure does not include the animals that may have been killed, escaped from traps and died, or been shot and died later, or were poisoned. It does not include the number that were not found and some part recovered.

We are constantly looking for improved methods for doing all of this work. We are looking for methods that are selective; in other words, methods that when we are trying to control coyotes will control coyotes, but will not do damage to other wildlife or to domestic livestock.

The hunting of coyotes from an airplane and the hunting of wolves from an airplane in Alaska is a 100-percent selective method and has been very successful. Particularly in areas where there are a considerable number of people where other methods cannot be applied effectively, you can often get in with an airplane, shoot the individual animal that is causing the trouble, and your problem in that locality for the time being at least is solved.

The livestock people, of course, particularly the woolgrowers, are concerned with predatory-animal control. Formerly there were many, many livestock operators that lost 10, even 15, percent of their livestock annually to predatory animal depredations. Such losses are indeed rare today but without continuous maintenance of control they would be right back where they were in a very, very short time.

Now, in addition to these major activities in the branch of predator and rodent control, we have a category of work that we sometimes term as nuisance problems. They concern bats in homes, in the attic, skunks in the backyard that they want to get rid of, moles in the lawn, or squirrels that gnaw holes in their buildings, and activities of that kind.

Those problems, while not serious and while usually purely local, do require that some method be available for solving the individual's problems.

We distribute a considerable amount of literature on these problems, put out instructions to the public for solving some of the problems that they are able to solve, and assist all of the cooperators with overall organization of an effective program to protect life and property.

If you have no questions, that is my statement.

The CHAIRMAN. Are there any questions?

Mr. ALLEN. Are there methods of controlling or exterminating the rat population which are pretty well developed?

Mr. GREEN. Yes; we can do very well in exterminating rats. Mice are a little more difficult, but some of the newer poisons that have come on the market in the last few years, some of the anticoagulant poisons, such as warfarin and pival are a big improvement over anything that we had before in controlling rats and mice.

Mr. ALLEN. Why are they not controlled, then?

Mr. GREEN. Partly for this reason: that you can kill rats out of a place, but that does not keep them out. One individual is almost helpless; even a business concern is pretty much helpless to control rats even in his own locality. He can do it on his own premises, but it is a constant everyday fight, and the minute he lets up on his ratproofing of his premises he has them right back again, and it really requires a communitywide effort.

Mr. ALLEN. That is all.

Mrs. SULLIVAN. Mr. Chairman, may I ask a question?

The CHAIRMAN. Mrs. Sullivan.

Mrs. SULLIVAN. Mr. Green, I noticed in our papers from my own home, which is St. Louis, that they are making a concerted effort now to cure the city of the rat problem, and I wonder, do they call on people like you or do they handle it with their own resources?

Mr. GREEN. Both. We have worked with the people in St. Louis in years past, and we have worked with the city agencies in a great many cities and towns.

Mrs. SULLIVAN. Would you know whether or not they had been in touch with you just recently?

Mr. GREEN. No.

Mrs. SULLIVAN. When I say this, it gave me the idea of getting in touch with them to see whether you might have been working with them.

Mr. GREEN. They have not been in touch with us here, but they may have been in touch with our field offices.

Mrs. SULLIVAN. Where would your field office be for my own State?

Mr. GREEN. For Missouri, Lafayette, Ind.

Mrs. SULLIVAN. There is nothing any nearer?

Mr. GREEN. No.

Mrs. SULLIVAN. If I may just ask one more question, Would the study of getting rid of starlings and pigeons come within your work?

Mr. GREEN. Not within the work of my unit.

Mrs. SULLIVAN. Who would handle that?

Mr. GREEN. It is an activity of Fish and Wildlife Service and would come within the branch of wildlife research.

Mrs. SULLIVAN. That has been a problem in many, many communities.

Mr. GREEN. Our office has frequently given out information that is helpful in solving those problems, but we take no direct action.

Mrs. SULLIVAN. That is all, Mr. Chairman.

The CHAIRMAN. Thank you very much. It has been very interesting.

The hearing will be adjourned until Tuesday morning of next week at 10 o'clock.

(Thereupon, at 12:35 p. m., the committee recessed to reconvene at 10 a. m., Tuesday, March 15, 1955.)

STUDY OF THE OPERATIONS OF THE FISH AND WILDLIFE SERVICE

TUESDAY, MARCH 15, 1955

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D. C.

The committee met at 10:05 a. m., pursuant to recess, in room 219, Old House Office Building, Hon. Herbert C. Bonner, chairman, presiding.

The CHAIRMAN. The committee will come to order.

The witness this morning to continue the hearings on the Fish and Wildlife Service is Mr. Suomela, Assistant Director. Will you give your background and full name?

STATEMENT OF ARNIE J. SUOMELA, ASSISTANT DIRECTOR, FISH AND WILDLIFE SERVICE

Mr. SUOMELA. Mr. Chairman and members of the committee, my name is Arnie Suomela. I graduated from the School of Fisheries at the University of Washington in 1924 with a bachelor of science in fisheries. In 1929 I returned to the University of Washington and received my masters of science in fisheries in 1931.

Prior to returning for further schooling in 1929, I entered the service of the old Bureau of Fisheries in 1924, and outside of the period of attending the university for my masters degree I was with that service until 1943. I resigned to become the managing biologist for the State of Washington Department of Fisheries and continued until 1945 in that position.

In July of 1945 I was appointed the State fisheries director for the State of Oregon and remained in that position until January of 1954, when I received an appointment as an Assistant Director to the Fish and Wildlife Service.

That completes my background, sir.

The CHAIRMAN. You have been connected with the Federal Fish and Wildlife Service only since January of 1954?

Mr. SUOMELA. No, sir, Mr. Chairman; I had 17 years in the United States Bureau of Fisheries and the Fish and Wildlife Service previous to returning to the Service in 1954. In all, I have had some 27 years of fisheries work.

One of the points that was left to be discussed this morning with the members of the committee was that having to do with the international commissions for the study of the fisheries of common interest to the United States and foreign countries. It might be said that

the United States is a member of five international fisheries commissions which are engaged in the study of the management of the marine fisheries for the United States and for the fishing industry. These five are the Northwest Atlantic Fisheries, having to do with the study of the ground fish, such as the haddock, the cod, the whiting, pollack, and other species. This is known as the International Commission for the Northwest Atlantic Fisheries.

We also have the Pacific Halibut Commission, which has to do with the study of the halibut of the North Pacific area.

The third is the North Pacific Fisheries Commission, which is a new commission which has to do with the study of the salmon fishery of the North Pacific area and especially up in the Bering Sea country.

The fourth is the Inter-American Tropical Tuna Commission which is a commission having to do with the study of the tunas in the Eastern Pacific in the neighborhood of Costa Rica, Panama, and off the coast of Mexico and California; and the last is the International Pacific Salmon Commission which is the international commission studying the Sockeye Salmon in the Fraser River.

I might mention very briefly the organization of these various commissions.

The International Commission for the Northwest Atlantic Fisheries is composed of 10 contracting governments, Canada, Denmark, France, Iceland, Italy, Norway, Portugal, Spain, the United Kingdom, and the United States. The date of entry into force of this convention was July 3, 1950.

The key provisions are that it established the international fisheries commission for investigation of the trawl fisheries of the Northwest Atlantic, and it requires the Commission to utilize insofar as feasible the research agencies of the several countres in the convention rather than setting up a separate research agency, and it also authorized the Commission to make recommendations for the regulation and conservation of the trawl fishery.

The Commission has developed in the last 4 years a very objective research program and it is the first time that this has been done in the history of the fisheries in the Northwest Atlantic. The machinery insures coordination of the research work of the various countries. Already there has been a regulation adopted by the Commission having to do with our haddock fishery off New England, and it is estimated that this regulation on the mesh size has increased the earnings to the American fishermen about $1 million annually. You might say that this is conservation with profit.

There are 3 commissioners from each of the countries on this Commission and it has an administrative staff of 4 persons. The staff does no research work. It coordinates the work of the several research agencies of the different countries. It plans and promotes the research work. The Fish and Wildlife Service is engaged in this phase of the research work of the Commission.

Its appropriation for the fiscal year of 1955 amounted to some $33,000. The United States' share is $2,900.

The Pacific Halibut Commission is one of the oldest commissions. The date of entry was in 1924. This convention has been renegotiated on 3 different occasions; 1 in 1931, 1 in 1937, and again in 1953. This also establishes the international commission for the further study

of the halibut fishery, and to recommend measures of conservation to the signatory nations. The signatory nations in this case are Canada and the United States. The treaties as they have been renegotiated give broad powers to the Commission in the regulation of the fishery and after approval by the negotiating countries, then the regulations are adopted and put into force.

The establishment of this Commission has resulted in the restoration of the halibut fishery. In 1931 the production was down to about 41 million pounds and in 1954, which was the all-time record, it amounted to about 71,000 pounds valued at some $14 million, of which the United States or fishermen's share was some $8,400,000.

Mr. ALLEN. Would you give the poundages again?

Mr. SUOMELA. The annual catch rose from 44 million pounds in 1911 to 71 million pounds in 1954. You might wonder that 44 million pounds seems quite a lot of fish, but that production was obtained by a very intensive fishery. All of the grounds were exploited and when the catch per unit of effort or catch per skate of gear is computed in 1931 it amounted to some 300 pounds per line. In 1931 the catch per unit of effort amounted to about 35 pounds per skate. In 1954 it amounted to about 300 pounds per skate.

Mr. TOLLEFSON. Would you explain what a skate is, for the record?

Mr. SUOMELA. A skate of gear is composed of a line on which hooks are attached to the line and then set in the ocean by anchors and also buoys so that they can tell where this string of hooks is located. In other words, it is just a line with hooks attached.

I think that that particular example shows just what the effect has been on the halibut fishery and through the studies that have been made by the two nations.

This Commission is composed of three representatives from each country. It employs a separate research staff. There are 15 people on the staff of the Commission. The funds are contributed equally by both countries and the Commission's appropriation amounts to about $100,000 a year.

The next commission on which I would like to touch briefly is that of the International Convention for the High Seas Fisheries of the North Pacific. This is a convention between three countries, Canada, Japan, and the United States. The date this convention went into force was June 12, 1953. It provides among other things that the contracting government shall not enter a fishery which is fully exploited, under study and regulation by one or more countries. It provides that Japan will abstain from the salmon fishery, the halibut fishery, and the herring fishery in the Eastern Pacific Ocean and Bering Sea east of the 175th meridian, and also that Canada will abstain from the salmon fishery east of the 175th meridian in the Bering Sea.

It also establishes an international fisheries commission to study the fisheries of concern to the contracting governments in the North Pacific and to determine which species of fish qualify for abstention.

Another point in convention is that it requires immediate study of the salmon fishery in the convention area, and you might say in the protocol area on the intermingling of stocks of salmon at the 175th meridian.

Mr. TOLLEFSON. May I interrupt there?

The CHAIRMAN. Yes.

Mr. TOLLEFSON. Japan and Canada both agree, to abstain from fishing east of the 175th meridian?

Mr. SUOMELA. In the Bering Sea.

Mr. TOLLEFSON. Does this apply to the area south of the Alaska peninsula? Canada is not going to abstain from fishing east of the 175th meridian, is she?

Mr. SUOMELA. In the Bering Sea area.

Mr. TOLLEFSON. She can fish east of the 175th south of the Aleutian chain of islands.

Mr. SUOMELA. Yes.

Mr. TOLLEFSON. But Japan cannot?

Mr. SUOMELA. That is right; Japan will abstain from fishing east of 175 degrees.

The work that will be done starting this present season will be the tagging of salmon in and around the 175th meridian to determine whether or not the stocks of salmon intermingle in the particular area so that it can be determined whether that line has been set properly or should be moved east or west, depending on where the stocks originated.

That work will be done by the Fish and Wildlife Service and by Japan in a program that was approved by all three countries last October at a meeting in Vancouver, British Columbia. The contract work will be also let to the Fisheries Research Institute of the University of Washington for some of that tagging work, and we hope that that work will be under way by this summer.

Mr. ALLEN. May I ask a question?

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. Is the effort that we are making sufficient and in balance with that made by Japan so that there is no possibility that they will be able to prove that many of their fish run far to the east of the line; and we at the same time will not be able to prove that our fish are going west?

Mr. SUOMELA. No, sir, Mr. Allen. We believe that the program will be in balance so that it will be definitely determined as to the origin of the stocks of fish.

Mr. TOLLEFSON. May I have a question?

The CHAIRMAN. Yes.

Mr. TOLLEFSON. Will we have observers on the Japanese boats?

Mr. SUOMELA. It is so planned there, Mr. Tollefson, that there will be an interchange of biologists between Japan and the United States.

This commission has four representatives from each of the countries, and it, in itself, will not engage in the research work. The research will be carried on by the research staffs of the Fish and Wildlife Service, by the Canadians, and by the Japanese. Its appropriation for the fiscal year 1955 amounted to $33,000, of which the United States' share was $11,000.

We also have the Inter-American Tropical Tuna Commission. The contracting Governments are Costa Rica, the United States, and Panama. The date of entry in force of this convention was in March of 1950.

The CHAIRMAN. Mr. Tollefson.

Mr. TOLLEFSON. Before you get away from that other Commission, the appropriations for this fiscal year were $33,000?

Mr. SUOMELA. Yes.

Mr. TOLLEFSON. That is not any money for reserve?

Mr. SUOMELA. Mr. Tollefson, I am sorry I did not make that clear. That is just for the administration, the administrative part of the Commission. The first amount that will be used to start the research work as far as the United States section is concerned, amounts to $180,000. That has to do with the tagging work and also some work that will be done on the King Crab in the convention area. I am sorry that I did not make that clear.

The Inter-American Tropical Tuna Commission is established by the convention that I just mentioned to investigate the yellowfin and the skipjack tunas of the eastern Pacific, and also the bait fishes used by the tuna fishery.

The other provision of the convention is that the Commission will recommend to the contracting governments measures to maintain the populations of skipjack tuna at sustained yield levels. The Commission has been in operation for only 4 years and during that time it has made excellent progress in the study of these fisheries and I might say, also, the bait fisheries that are so essential to carry out the yellowfin fishery.

It has not made any recommendations as yet for control measures, but its study does indicate that the yellowfin fishery is at its maximum yield right at the present time, and it might be necessary that conservation measures will have to be put into effect.

One important piece of work which has been done as far as the tuna bait fishery is concerned is that of the transplant of anchovetta. Anchovetta is a small sardine or anchovy-like fish. There was off the coast of Costa Rica a very sizable population of anchovettas and the population dwindled and it is felt that perhaps the bait fishery was the cause of the reduction in these populations. There have been transplants of anchovetta made by the Commission to the bays off Costa Rica and it appeared that the transplant was successful. They observed the young of the anchovetta in the bay which before had not been there up until the time that these populations had been reduced, so it appears that it is quite hopeful that some of the bait fisheries can be restored in the Costa Rican area. That work, however, will be pursued and followed by the research staff.

Panama adhered to this convention in 1953; Costa Rica in 1950.

The Commission consists of 4 members from each contracting government and the Commission employs a staff of 21 research workers.

Funds for its operations are obtained on the basis of the amount of yellowfin and taken by each of the contracting governments.

Its appropriation for the fiscal year 1955 amounted to $151,000. The United States share was $150,000. That is based on the take of the different countries.

If there are no questions on that one, I will proceed.

The CHAIRMAN. Mr. Allen?

Mr. ALLEN. I understand that the United States take of fish is about 95 or 98 percent of the total tuna take in this area.

Mr. SUOMELA. Yes, sir.

Mr. ALLEN. One more question as to whether the programs are in balance. It has seemed to me that the amount of money going into the Pacific Ocean fisheries investigation was concerned almost entirely with tuna and the amount of money going into the Tuna

Commission which had to do with the way tuna was running out more than the tuna itself is way out of proportion. Heretofore I believe the POFI transaction has been getting between $700,000 and $1 million a year for its effort while the Inter-American Tuna Commission has been getting from $60,000 to $100,000.

In your opinion, are those efforts in balance or are they so coordinated that one investigation is doing part of the work of the other?

Mr. SUOMELA. Mr. Allen, I believe that all of the work on the Pacific coast having to do with the tuna is coordinated. In fact, there is a committee known as a coordinating committee which is represented by not only the Pacific Oceanic Fisheries Investigation staff but all the staffs on the Pacific coast, and they coordinate the work so that there will be an interchange of information among the agencies studying tuna so that they can avoid any overlap of work that might be conducted.

I think it is a case in point in the work that will start on the albacore research north of the Hawaiian group and that will be coordinated with the State of California and also the States of Washington and Oregon. The amount of money might not be in balance, but I certainly think the programs are well coordinated.

Mr. ALLEN. It is my recollection of the hearings on the bill to set up the POFI activities that it indicated that the investigation was to be almost limited to an investigation of a potential fishery for the Hawaiian Islands, particularly the run of tuna that appears there for 90 or 120 days pretty close into shore, but that, actually, the investigation spread far beyond the scope that was discussed here.

Meanwhile, it would seem to me that the Tuna Commission has done far less of the work which we had talked about it doing and that the POFI group have done far more.

I was wondering whether you had any opinion on that?

Mr. SUOMELA. I might say that I think the language of the act, as I recall it, stated that the work would be done on the tunas of the tropical and subtropical areas of the Hawaiian group and trust territory, but I believe there is also language in there that also mentions the intervening seas of which economic benefits would be not only derived by the people in the islands, but also the Pacific coast.

Mr. ALLEN. Do you investigate albacore in the tropical and subtropical water?

Mr. SUOMELA. No, but I was just thinking that if there were studies conducted on the albacore, certainly it would be an economic benefit to people living on the Pacific coast.

Mr. ALLEN. I have no criticism at all of the activity that has been carried on, but I have grave doubts as to whether this committee ever authorized it. The thought was that it might be well to review the laws that are on the books and have amendments, if necessary, passed to properly authorize the work.

Mr. SUOMELA. Yes. I might add, too, Mr. Allen, that the additional funds that will be used for the investigation of albacore were, and now are, derived from the funds set up under the Saltonstall-Kennedy Act. That amounts to $234,000 for the exploratory work north of the Hawaiian group on albacore.

Mr. PELLY. Mr. Chairman, could I ask the witness a question?

The CHAIRMAN. Yes.

Mr. PELLY. I understand that some of our tunafishing vessels have been seized by Peru at times. Is Peru a member of any contractual group that conserves the fish or in any way has an agreement?

Mr. SUOMELA. No, Mr. Pelly. Peru is not a member of any of the international commissions of which the United States is a member. It is a member, with Chile and Ecuador, of the Permanent Commission on Exploitation and Conservation of the Maritime Resources of the South Pacific, a new organization which held its first meeting this year.

Mr. PELLY. How far out do they seize our vessels?

Mr. SUOMELA. They claim jurisdiction 200 miles out.

Mr. PELLY. 200 miles?

Mr. SUOMELA. Yes, sir.

Mr. PELLY. That is all.

Mr. SUOMELA. The next commission that I would like to discuss is that known as the International Pacific Salmon Fisheries Commission. This has to do with the conservation of the Fraser River sockeye salmon.

The provisions of the convention established a commission to study the sockeye, to engage in fish cultural operations, and also make recommendations to the contracting governments for regulation of the fishery, and also to remove obstructions in the Fraser River system so that the salmon could use the spawning grounds that had been cut off. It authorized the Commission after 8 years of study to put in regulations. These regulations have been put into effect by the United States and by Canada. The treaty requires that the fishery be divided equally between the 2 Governments; that is, the United States and Canada, and it also provides for joint enforcement of the regulation by the 2 countries. The result has been that the work of the Commission has restored the salmon runs to the Fraser River.

The fishery which produced you might say practically nothing in the years prior to the convention, that is in 1937, produced some 47 billion pounds in 1954. The catch was valued at $31 million and the United States fishermen's share of that fishery was some $15 million.

I think this is another example of what can be accomplished by international commissions in the establishment of fisheries which have been very badly depleted.

Mr. TOLLEFSON. Mr. Chairman?

The CHAIRMAN. Mr. Tollefson.

Mr. TOLLEFSON. With respect to the sockeye salmon, it was necessary that a commission be formed in order to have any conservation practices at all, was it not?

Mr. SUOMELA. I did not understand.

Mr. TOLLEFSON. Neither nation could have gone forward on its own with respect to conservation of that fishery?

Mr. SUOMELA. No.

Mr. TOLLEFSON. Would you explain why on the record?

Mr. SUOMELA. Yes, I would like to explain the reason for that. The fish are caught on the high seas and in both United States and Canadian territorial waters. The efforts of either nation to control its fishermen alone would accomplish little. Cooperative work was needed. The Commission is in effect the machinery which makes cooperation in research and regulation possible. It is that the runs

of salmon going into the Fraser River must pass through waters under the jurisdiction of the State of Washington and is, as I mentioned, 1 of the provisions in the convention that these salmon that were bound for the Fraser must be divided equally between the 2 countries and the commission, after 8 years of research, determined the migration routes of the salmon. They determined the time of migration of those fish through our American waters and at the time that they entered the Fraser, so that the regulations that have been adopted are based on good, scientific data and I might say that there is just a difference of, I think, less than 1 percent over the years that it has been regulated—the difference in the catch between the 2 countries—and if I remember correctly that catch favors Canada.

Mr. TOLLEFSON. I am much interested in the work of that Commission. As I understand it, in this last and in previous years, but it was particularly pointed up last year, that the Commissioners wanted only a certain number of fish to escape upstream for spawning purposes. That was not a 50 percent escapement, was it?

Mr. SUOMELA. No; in fact, Mr. Tollefson and members of the committee, in the run this year into one of the river systems of the Fraser known as the Adams River it was found that we had too many fish on the spawning grounds, and in this particular river system it has been found that it requires only about an 18 percent escapement of the entire run that is coming in to the Adams River; and if it had not been for certain conditions that prevailed at the time the Adams River run was coming in, more fish certainly could have been taken and still we would have had sufficient brood to take care of the spawning up in the Adams River.

Mr. TOLLEFSON. Am I to understand that a limited amount of fish will be permitted to escape for spawning purposes every year? The thing that concerns me is that I recall on several occasions seeing a map of Canada showing that vast Fraser River system with its tributaries and it seemed to me that there was a tremendous amount of sprawning area up there. What are you going to do about that sprawning area, if anything?

Mr. SUOMELA. That problem is being studied by the research staff of the Commission. There are some areas that are cut off by natural obstructions such as falls. Those areas are being studied, but before some of the areas are you might say made available to salmon by constructing fishways over falls, the area above is being studied as far as conditions are concerned, ichthyological conditions and temperature and winter conditions to see whether or not certain races that might be transplanted into the area above would survive and be able to rehabilitate the area.

So the Commission's staff is certainly going at the work on a very scientific basis so that they will know just what they are doing with the river system in question.

Mr. TOLLEFSON. From your information about the possible spawning areas in Canada, is there not a terrific potential for greater spawning areas than now are in existence?

Mr. SUOMELA. Yes, indeed.

Mr. TOLLEFSON. It is entirely possible that even bigger runs of salmon may be brought about there?

Mr. SUOMELA. That is certainly the objective of the Commission, Mr. Tollefson.

Mr. TOLLEFSON. That is all, Mr. Chairman.

Mr. ALLEN. Mr. Chairman?

The CHAIRMAN. Mr. Allen.

Mr. ALLEN. Can Mr. Suomela explain a little more for my benefit at least the manner in which you keep the catches for the two nations about even?

Mr. SUOMELA. That is done by a system of regulation by having the closed areas staggered. For example, you might have 2 days of fishing in the outside areas in the Straits of San Juan de Fuca and get those fish through and either shorten the open period or lengthen it, whatever the case may be, on the other side as the fish get into Canadian waters. This is determined, too, by a very, very precise statistical system, on the gathering of statistics on a daily basis when those fish are passing through, so that the Commission's staff knows just what the catch of the American side is and then they can gage by either closing or opening on the Canadian side so as to equalize the catch.

Mr. ALLEN. I take it then that only Americans fish in American waters and only Canadians in Canadian waters?

Mr. SUOMELA. That is right.

Mr. ALLEN. The Americans get the first catch, and the Canadians get a sufficient time to equal the catch?

Mr. SUOMELA. I think it is just the reverse, Mr. Allen. When those fish come in on the west coast of Vancouver they are coming in from the north, and you might say that Canadians might get the first opportunity to fish. Of course, there is intermingling in the high-seas area where both fish outside the 3-mile limit.

Mr. ALLEN. Is there any different method of fishing that the Canadians use against the Americans? It seems to me that the traps that they took in the Fraser River run were eliminated in the State of Washington.

Mr. SUOMELA. That is right.

Mr. ALLEN. Is there any indication from scientific information which would show whether or not those traps were destructive of the fish more than any other method of fishing?

Mr. SUOMELA. I don't think so, Mr. Allen, for this reason: That the Commission requires, you might say, certain proportions of the run to come in, and the gear is so regulated that all gear is affected during the time that the fishery is being regulated. I don't think that there is any information. At least I have not seen anything where the traps are more destructive than any other type of gear in that area.

Mr. ALLEN. It appears that the Fraser River run has been restored and is prospering almost beyond what you would want as far as brood stock is concerned. On the other hand, it appears that many of the runs in Alaskan rivers are going down to a danger point. That proposes the question: Is there any different approach to the problem that is used with regard to the Fraser River, different method of controlling escapement or brood stocks, that would account for a difference in the success of the two efforts?

Mr. SUOMELA. I think, Mr. Allen, that probably to answer that I will answer in this way: That the environmental conditions in the red-salmon streams in Alaska and especially those of Bristol Bay certainly may be much different than those in the Fraser River system.

We might have entirely different conditions in our river systems and in Alaska.

I might say that in that connection it is our hope to have a very good research program started in the Bristol Bay area very, very shortly so that we can attack these problems that we have up north, up in Alaska, probably along the same lines that they have been attacking the problems in the Fraser River system.

Working toward that end, I believe that we certainly might be able to devise well-founded regulations for our fisheries up north.

Mr. ALLEN. Thank you.

Mr. SUOMELA. I think that those are the five main conventions.

We do have several other conventions that I might mention. There is the International Whaling Commission. This is a Commission composed of 16 nations in addition to the United States. It has to do with the conservation of the whale stocks. The Commission has no research agency as such. The schedule, or you might say amendments or regulations, are submitted to the Commission, and they are acted upon by the Commission.

This Commission was entered into force in 1948. The appropriations of the Commission amount to about $7,000, of which the United States share is $420. It has a part-time secretary. The American Commissioner is Dr. Remington Kellogg, Director of the United States National Museum.

We have the Great Lakes Fisheries Convention, which has been submitted to the Senate for its advice and consent to ratification but has not yet been acted upon by that body. The purpose of that convention is to establish a Commission to study fisheries of common concern to Canada and the United States and also for the study of the control of the sea lamprey, which has caused heavy depredation of the lake trout in the Great Lakes, especially in Lake Huron and Lake Michigan. Lake Superior still has fair stocks of lake trout, and it is hoped that the research agencies of the two signatory countries, the United States and Canada, will be used for these particular studies.

The estimated appropriation for the first few years will be $830,000. At the present time the Fish and Wildlife has studied the sea lamprey problem and has installed devices for eradication of the sea lamprey. However, we have just been scratching the surface as far as the number of devices to be used for the control of the sea lamprey, and it is our information that Canada has started the work on the sea lamprey by installing devices such as those that have been installed by the United States for sea-lamprey control. It will, I think, certainly be a step in the right direction to have this Commission in operation just as quickly as possible.

The other two points that I might make mention of here—and I do not know whether they were discussed by Director Farley—is the migratory bird conventions between Canada and the United States, and Mexico and the United States, having to do with the protection of our migratory waterfowl by the establishment of refuges, the protection of insectivorous birds, and also the prohibition of hunting from aircraft. These two conventions were effected, the first one in 1916 with Canada and in 1937 with Mexico.

Then we have the fur-seal convention which came into being in 1911 between Canada, Russia, the United States, and Japan. This

had to do with the prohibition of pelagic sealing north of the 30th parallel and called for joint enforcement of the regulations and also the sharing of the proceeds from the annual kill of Robben Island, the Commandorskis, and the Pribilofs.

During the period of the convention from 1911 to 1941 when the prohibition was in effect the fur seal population on the Pribilof Islands rose from 123,000 in 1911 to about 1½ million in 1941 with an annual kill of some 12,000 in 1911 to 95,000 in 1941.

The annual kill has been stabilized somewhere between 60,000 to 70,000 animals per year. I think the average has been around 65,000.

The Robben Island herd is believed to have reached its biological maximum, but we certainly have not very much information on the Commandorski herd. In 1941 Japan abrogated the treaty, giving as the reason the tremendous growth of the herd which they say resulted in the destruction of the salmon fishery off the coast of Japan.

In 1942 Canada and the United States concluded a provisional agreement keeping in force the provisions of the previous treaty and this agreement was extended in 1947 and continues in force and effect today.

I think, Mr. Chairman and gentlemen, that that covers quite briefly the conventions that the Fish and Wildlife Service are interested in and with your permission, if there are no further questions I would like to proceed.

Mr. ALLEN. On the seal herd as a practical matter, is Russia still following the same practices which she observed under the treaty with regard to the seals?

Mr. SUOMELA. We don't know what Russia is doing.

Mr. ALLEN. There is no evidence that the herd on the Pribilofs is being depleted?

Mr. SUOMELA. No.

Mr. ALLEN. Where is Robben Island?

Mr. SUOMELA. That is off the coast of Japan.

Mr. ALLEN. Is that now used by Japan?

Mr. SUOMELA. The island is under Russian control.

Mr. ALLEN. Does Canada have any opportunity to take the seals?

Mr. SUOMELA. No; no opportunity at all. Where Canada comes in is the migration up the coast and the protection of the fur seal.

The CHAIRMAN. That finishes your testimony?

Mr. SUOMELA. Yes, sir.

The CHAIRMAN. Last week we were told that the striped bass situation on the Atlantic coast was going to be discussed here today. Who is going to discuss that?

Mr. SUOMELA. I will attempt to discuss that, Mr. Bonner. I am sorry that it was just brought to my attention this morning, since I just got into the city last night. I will try to cover some of the highlights of the cooperative striped bass program.

The Service acts as a coordinator of this program which is sponsored by the Atlantic States Marine Fisheries Commission through the striped bass committee. There are now five definite research programs underway which have been undertaken with the assistance of the Dingell-Johnson funds.

The definite programs are being carried out by Massachusetts, New York, Maryland, South Carolina, and Florida. There are other State

agencies and universities, however, working on the striped bass program. It is estimated the expenditures for the striped bass work for the fiscal year 1954–55 amounts to about $82,000. The anticipated length of the program is estimated to be about 3 years.

In Massachusetts the work consists of creel census. The biological work is being carried on to determine the age of the striped bass and this all has to do with whether the populations of striped bass are local populations or whether they are populations intermingled with other areas along the coast.

In Rhode Island there is some striped bass work being carried on for racial studies and in this last year there were 30-some-odd striped bass tagged for study of migration and also for studies having to do with the studies on populations, as to whether or not they are local populations in the rivers in Rhode Island.

Connecticut has been doing some work sampling both the juvenile and the adult striped bass. Scale samples have been taken to determine ages and also for racial work.

There has been a Dingell-Johnson project authorized for Connecticut just as soon as a biologist has been appointed to carry on the work on a larger scale.

In New York quite a good deal of work has been done on the Hudson. Regular collections of young and old fish have been made and limited tagging has been done in the Long Island Sound area. Here, also, a lot of work has been done as far as the racial phases of the investigation are concerned. It has been found that the Hudson River is a separate stock of fish so that when that has been determined certainly regulations can be recommended to the Atlantic Marine Fisheries Commission to the State of New York for protection of the stocks of striped bass entering the Hudson.

In New Jersey they are continuing the inventory of the recreational fishery on the striped bass and I think they are doing considerable work on the coastal rivers for the life history studies on particular species of fish.

Delaware is doing intensive work on the catch statistics of the striped bass fishery. This is being done through the University of Delaware.

In Maryland there was a laboratory set up at Matapeake in 1954 to study the spawning habits of the striped bass in the several rivers in Maryland. The principal spawning grounds have been located and last year more than 300 fish were tagged on the spawning grounds and most of the tag recoveries were made in the nearby areas.

The CHAIRMAN. Where are the spawning grounds?

Mr. SUOMELA. In this particular area the spawning grounds are in the Choptank, Nanticoke, Wicomico, Potomac, Susquehanna, Elk, Pocomoke, and Chicamacomico.

The CHAIRMAN. What kind of area comprises these spawning areas?

Mr. SUOMELA. I think I would have to submit that for the record. I could just not answer that question offhand as to just where they are. The striped bass spawns in the lower reaches of rivers where there is a good current.

The CHAIRMAN. Has there been any study—are the Fish and Wildlife Service themselves doing anything on this specie of fish?

Mr. SUOMELA. They are just acting as coordinator.

The CHAIRMAN. That is what I thought.

Mr. SUOMELA. The State agencies are doing the work. The Fish and Wildlife Service acts as a coordinating agency.

The CHAIRMAN. Have you put any of these fish in hatcheries?

Mr. SUOMELA. Not to my knowledge, Mr. Bonner.

The CHAIRMAN. Who is going to come in this morning who has some knowledge of this subject?

I asked for a discussion of this last week by somebody who knew what had been done by Fish and Wildlife on this specie of fish.

Mr. SUOMELA. I am very sorry, but the information that I had was just what had been done by the State agencies on the work on the striped bass.

The CHAIRMAN. As a whole the Fish and Wildlife Service has not done anything but just has observed what the States have been doing?

Mr. SUOMELA. And act as coordinator in the programs and assist the States in developing research programs.

Mr. Chairman, if there is further information on this I would certainly like to submit it to you.

Mr. ALLEN. May I ask a question?

The CHAIRMAN. Yes.

Mr. ALLEN. Mr. Suomela, the various coastal areas now are pretty well covered with these interstate commissions which I understand take a variety of work, and their authority is all exercised through the State government, I believe.

My question is: Does the Fish and Wildlife Service or any agency of the Federal Government supervise this work with the thought that if any area of work is being omitted the Federal Government will make sure that it is undertaken?

Mr. SUOMELA. I think that is correct, Mr. Allen. Where the States have come into the study of the striped bass which was started intensively just this last year was by the use of the Dingell-Johnson funds.

Mr. KLUCZYNSKI. Mr. Chairman, is anybody going to explain the trout? We had a trout bill last session. Is anybody going to investigate the un-American trout? May we have somebody explain that to us? You remember the trout bill.

The CHAIRMAN. Is this fish a local fish, or is it a migratory fish? Does it go to sea and come back?

Mr. SUOMELA. Yes, it does, but as some of the work has pointed out, Mr. Bonner, some of these fish are local populations. They do not migrate too far away from the particular stream, rather than being migratory up and down the coast.

That is one of the important phases of the work, to determine whether or not these particular races of striped bass are local in nature or whether they have the migratory pattern up and down the coast. That is very important as far as the regulation of the fishery is concerned.

The CHAIRMAN. Under this new fund you say there is going to be a study of this fish in Connecticut? Is that what you said?

Mr. SUOMELA. Yes.

The CHAIRMAN. Where will that study be made?

Mr. SUOMELA. The Long Island Sound and tributaries. All of these States at some time or other in the program, I believe come into the picture.

Massachusetts is studying some parts of the program and some parts of the program are under their own funds at the present time.

The CHAIRMAN. Where is the largest concentration of this fish and where is the most important?

Mr. SUOMELA. I think that the fish is important up and down the coast. There is a big concentration in the New England States of the striped bass. There are concentrations off the New York area. There are concentrations of the striped bass in the Middle Atlantic States. I believe that the striped bass is a very important fish up and down the Atlantic seaboard. The principal concentrations of this fish are in Chesapeake Bay and Albemarle Sound.

The CHAIRMAN. Is there going to be any study of it under these new funds in the South Atlantic area?

Mr. SUOMELA. I think, Mr. Bonner, that this will depend on what the States want to do.

The CHAIRMAN. Who set up this study in Connecticut?

Mr. SUOMELA. The State agency sets it up.

The CHAIRMAN. It is by matching funds?

Mr. SUOMELA. Yes, there is the matching fund.

The CHAIRMAN. How is it set up?

Mr. SUOMELA. I think it is on the basis of 75 and 25.

The CHAIRMAN. There was some mention here the other day of control of water in these dams and powerplants that have been built througout the country. What is that?

Mr. SUOMELA. I don't know what the discussion was, Mr. Bonner.

The CHAIRMAN. As I understand you had an agreement with the engineers or whatever agency constructed these dams as to the flow of water for the fish.

Mr. SUOMELA. I believe that has to do with some talk.

The CHAIRMAN. Has anybody from your agency a copy of that agreement here this morning?

Mr. SUOMELA. The only agreement we have, Mr. Bonner, is an agreement with the Corps of Engineers having to do with studies at dams in relation to the protection of both the young fish going down dams and the adults going over the dams using the fishways. This has to do with the cooperative study between the State agencies on the west coast and the Fish and Wildlife Service with the Corps of Engineers, but we have no agreements as to any funds derived from the power produced.

The CHAIRMAN. This was not that. This was the amount of water to sustain the spawning area of fish and so forth.

Mr. SUOMELA. I don't recall any agreements on that. I certainly will check it.

I was going to say that in addition to Delaware and Maryland, Virginia is doing some work on the striped bass. And in North Carolina studies have been started on the Roanoke River for an attempt to distinguish between the small striped bass and the adult striped bass; that is, the larger bass in the Roanoke.

The CHAIRMAN. What do you mean, a study between the small and large fish?

Mr. SUOMELA. Apparently they have what they call the so-called short rock and it is, as I am able to learn, a different fish so far as the size is concerned than the other striped bass that you have in the Roanoke.

They are making a study of that to learn the difference between those two and the hatchery at Weldon has been supplying eggs and larvae to aid the biologists in identifying materials from these natural sources on the eggs, and larvae they pick up from natural spawning so that they can determine whether or not they are getting striped bass eggs and striped bass larvae from the Roanoke River; and the hatchery is supplying a lot of the artificial propagation material for that work.

The CHAIRMAN. Is there any particular bottom that this fish prefers to spawn on?

Mr. SUOMELA. That, Mr. Bonner, I would like to supply you. I am just not too familiar with the conditions of the striped bass spawning grounds. Since striped bass eggs are semibuoyant the type of bottom is not too important.

In South Carolina considerable work is being done on the Santee Cooper Reservoir areas. The fish have been tagged to determine their migrations.

In that particular area there are apparently two you might say races of striped bass, one which apparently spends its entire life right within the river area, and the other which migrates out into the brackish water and returns upstream to spawn. Those two particular forms are being studied.

In Georgia there is an interest in activating the striped bass study in that particular State.

In Florida the St. Johns River is being studied for the striped bass fishery. Here in the St. Johns as in other areas a considerable amount of tagging has been done and also life history work has been started. The Fish and Wildlife Service has contributed the services of two individuals for coordinating the work through the Atlantic States Marine Fisheries Commission, and during the summer of 1954 field studies were made in New York and Virginia and North Carolina in an attempt to locate the precise habits of the young and to attempt an assessment of the strength of the year classes of the striped bass.

So there has been some work started in those particular States on the precise life habits of the striped bass.

The coordinator has also assisted the personnel when called upon to do so in determining the research programs.

I am sorry, Mr. Bonner, that I do not have anything more to add to this particular part of the program, but certainly we will supply you with any other additional materials that you have requested, and especially on the spawning habits and the use of the particular spawning grounds which they use.

The CHAIRMAN. Thank you, sir.

Mr. THOMPSON. May I ask a question, Mr. Chairman?

The CHAIRMAN. Yes.

Mr. THOMPSON. I would like to know as a matter of information the answer to this question. We have a striped bass in Louisiana, which is usually a pan fish and very seldom as far as I know reaches a size above 2 pounds. They go to the smaller stream to spawn and return to more or less brackish water in the large inland lakes in the area.

I wonder if that is the same family as these huge striped bass which we see off the Atlantic coast?

Mr. SUOMELA. I cannot answer that, Mr. Thompson, but we will certainly get that for you for the record.

(Information supplied is that they are.)

Mr. THOMPSON. They resemble each other in regard to everything but size.

Mr. SUOMELA. They probably are the same species. We do have a striped bass fishery out on the west coast and in the State of Oregon, Mr. Bonner, where I am a little bit familiar with our striped bass. It seems as though it is just a mass spawning, that is just a mass gathering of fish and the spawning takes place en masse.

I will certainly check that with the spawning on this coast and furnish it for the record.

The CHAIRMAN. Are there any further questions?

Mr. RAY. Mr. Chairman?

The CHAIRMAN. Mr. Ray.

Mr. RAY. I missed the earlier testimony on the striped bass. We have several bills before us aimed at limiting catching of striped bass to hook and line fishing. Does that subject matter come within your jurisdiction?

Mr. SUOMELA. No, sir.

Mr. RAY. Then there are two other bills aimed at preventing dumping of factory slag offshore which is said to affect the quantity of striped bass particularly around the New York area. Does that come under your jurisdiction?

Mr. SUOMELA. I think that comes under the jurisdiction of the States, Mr. Ray, and also under the jurisdiction of the Public Health Service where they do make recommendations as far as pollution control is concerned, but I think it is a State agency that certainly has the jurisdiction over the pollution problems.

Mr. RAY. Regardless of how far out the dumping would take place?

Mr. SUOMELA. That I am not able to answer.

Mr. RAY. I would be interested in knowing if they have done any work in that field.

Mr. SUOMELA. We can furnish you that.

(The information is as follows:)

Beginning in 1948, studies were made on the effects of acid-iron waste disposal at sea by the Woods Hole Oceanographic Institution in cooperation with the Service and sponsored by the National Research Council. Several reports were published on these studies.

Mr. RAY. All right. That is all, Mr. Chairman.

The CHAIRMAN. We have touched on the shadfish.

The former chairman of this committee introduced a resolution that was adopted and appropriations were made for the study of shad in the Chesapeake and southeast waters. What has been the result of that study? What has been the accomplishment? Have you found out anything about the shad?

Mr. SUOMELA. I thought that that was discussed by Dr. Walford last Tuesday here before the committee when he discussed this shad fishery and the shad work. It was my understanding, Mr. Bonner, that you just requested that.

The CHAIRMAN. You brought me this memorandum this morning because I asked for some information about it but I do not think the record will show that gives any results of the studies. That is what I wanted to find out—what the results are.

All these investigations and commissions and studies are there, but what is eventually accomplished, what is found out. (See p. 110.)

Mr. SUOMELA. I think that I can probably recite some results on the Hudson.

The CHAIRMAN. I was talking about this resolution that Mr. Bland had in the Chesapeake Bay that was a specific resolution and appropriation was made for it.

Mr. SUOMELA. I think that I am at quite a loss on that. I certainly will have to submit that for the record or have someone come up here that can talk about that particular phase of it.

The CHAIRMAN. Mr. Thompson.

Mr. THOMPSON. Mr. Chairman, I had a query relative to the salmon runs in Alaska. Unfortunately I did not receive it.

The CHAIRMAN. We have had enough talk on salmon here to fill each room of this building.

Mr. THOMPSON. There was one particular point that I thought had not been touched upon here. That had to do with the depletion of the salmon run in Alaska.

He informed me that Alaska was the only area in which these huge trap nets were permitted to be used and he thought that that accounted for the loss.

The CHAIRMAN. Mr. Allen asked that question a little while ago as to the difference between the taking in trap nets.

Mr. THOMPSON. I am sorry that I did not have the query earlier but I wanted to get the information if it had not been given to the committee as to the difference in the regulation in our salmon rivers in the United States and Alaska.

The CHAIRMAN. The gentleman answered that. You may tell him again.

Mr. SOUMELA. Mr. Allen asked about the traps in connection with the sockeye salmon industry on the Puget Sound and the use of the traps in the British Columbia as against the nonuse in the inland waters.

Mr. THOMPSON. If this is in the record, I can get it from the record.

Mr. SUOMELA. I told Mr. Allen that as far as I knew there was no difference in the catch by the use of the traps as being more destructive than the use of purse seines or gill nets.

Mr. THOMPSON. I was wondering why the difference in regulation then where they are excluded from use in the United States streams and the Department restrictions or nonrestrictions in the Alaskan area.

The CHAIRMAN. Has the development of the shrimp industry diminished noticeably, or according to the record——

Mr. THOMPSON. I do not think that the shrimp fishery has diminished, Mr. Bonner.

The CHAIRMAN. I said that the shrimp industry has been on the increase all the time, but has it noticeably decreased the amount of poundage of trout on the commercial market?

Mr. SUOMELA. The only trout that you would find on the commercial market are those supplied to the market by individuals who have commercial trout farms.

The CHAIRMAN. There are trout in the ocean.

Mr. SUOMELA. I am thinking of the inland trout. I don't believe that there has been a diminution of the sea trout, Mr. Bonner. I think that their production has been pretty well established on the sea trout.

The CHAIRMAN. What you say is by record?

Mr. SUOMELA. Yes, and I will certainly furnish you some figures on that.

(The information is as follows:)

Production of sea trout or weakfish in North Carolina, various years

	Pounds		Pounds
1930	3,027,000	1950	2,049,000
1940	4,787,000	1951	1,530,000
1945	5,237,000	1952	2,269,000

The CHAIRMAN. Are there any other questions?

Thank you very much, sir.

Mr. SUOMELA. Mr. Bonner, may I at this time introduce Mr. Stillman Wright, who is the acting chief of the Office of Foreign Activities, who will discuss in addition to what I have discussed on international agreements, the responsibility of the Service for carrying out some of the technical aid to foreign countries.

Mr. Wright, I think, is ready at this time to discuss that particular phase of it.

STATEMENT OF STILLMAN WRIGHT, ACTING CHIEF, OFFICE OF FOREIGN ACTIVITIES

Mr. WRIGHT. Mr. Chairman and members of the committee: Is it your desire that I give some biographical material?

The CHAIRMAN. Yes.

Mr. WRIGHT. I am a native of the city of Chicago, but spent most of my early life in the State of Wisconsin. I was in the Armed Forces during the First World War and returned from that to enter Beloit College in Wisconsin, and graduated there in 1921.

In the following 2 years I was a high-school teacher in South Dakota and returned to college after that, receiving the degree of doctor of philosophy from the University of Wisconsin in 1928.

Sometime before that graduation I entered the Bureau of Fisheries as an employee, the Bureau of Fisheries being a predecessor agency of the Fish and Wildlife Service, and I remained from 1927 to 1933.

At that time I went to South America and was employed by the Governments of Brazil and Argentina for 5 years. I returned to the Bureau of Fisheries in 1938, working in the Western States on trout problems. Later I came to the Chicago office when this agency had its headquarters there, and then came to Washington with it in 1947.

I have been with the Office of Foreign Activities since 1948, and acting chief since 1953.

With regard to the foreign-aid program as it affects the Fish and Wildlife Service, we have been cooperating with the primary agencies concerned with that program since its inception in 1938, and always on funds transferred from those primary agencies such as the Department of State, later the Technical Cooperation Administration, and then the Foreign Operations Administration.

This work was started in 1938 by legislation, Public Law 545 of the 75th Congress, which authorized the temporary detail of United States employees who have special qualifications to governments of Latin America and the Philippines to assist them in technical developments of various kinds.

Then in 1938 the President set up the Interdepartmental Committee for Scientific Cultural Cooperation to carry out those programs.

I want to jump 2 or 3 steps now, and tell you that a short time ago our relationship to the primary agency in carrying out this program has been changed markedly. Always in the past our employees on foreign assignment were employees of the Fish and Wildlife Service, and received their pay from us. On January 15 all but a very few of those employees were taken over by Foreign Operations Administration. As a result of that change, our Service now has the status of an investigating and assisting agency, assisting them in recruiting and also in providing training for foreign students.

Prior to that time we recruited the men and sent them on foreign assignments and gave them technical backstopping and had pretty large control over the employees except for administrative purposes.

However, since the beginning all of these programs have depended upon request by the other countries for technical assistance. Then those requests were presented to representatives of the United States Government in the foreign country, reported to Washington, and there were consultations held with the Fish and Wildlife Service to determine the technical feasibility of the proposed programs.

In about the 17 years that the program has been carried on we have had missions in 21 different countries, projects in foreign countries where we employed and sent out technicians to assist the other countries in development of their resources.

The general purpose of those programs as it concerned the Fish and Wildlife Service was to improve the food, the diet of the underdeveloped countries of the world, and we believe that the fisheries provide a very excellent means of doing that for the reason that they give at rather low cost food with a high protein content and also vitamins and minerals that cannot be obtained readily from other foods.

Mr. VAN PELT. Mr. Chairman, may I ask a question?

The CHAIRMAN. Yes.

Mr. VAN PELT. You are speaking of diets of these countries. Do you mean that men out of your office are going in as task forces in various countries to show these people how to eat fish and so forth?

Mr. WRIGHT. Well, in most places it is a question of showing them how to catch fish and then make them available to people rather than showing them how to eat them. There are a few countries where fish are available and still form a very small part of the diet merely because it is not one of the customary foods of the country.

Mr. VAN PELT. How long did you say we have been doing this?

Mr. WRIGHT. Since 1938.

Mr. VAN PELT. What has been the response? How has the program been received?

Mr. WRIGHT. Well, as I say, out of the many countries which could have aid of that kind only 21 have actually had missions, but additional ones up to total of about 30 have sent trainees here. They did

not have Americans in the other country but sent us trainees for additional primary training to assist them in developing their projects.

Mr. VAN PELT. Would you list briefly a few of the countries?

Mr. WRIGHT. I think I can submit those.

Mr. VAN PELT. Would you submit those for the record?

Mr. WRIGHT. They begin with Mexico, El Salvador, Peru, Liberia, Egypt, Lebanon, Iran, Pakistan, India, and Indonesia. Then one of the very large programs was the Philippine program following the World War when as a result of this Public Law 370 of the 79th Congress the Philippine Rehabilitation Act of 1946 permitted us to carry on a very large program of fishery development there.

Then I mentioned just a few of the countries in which we have had large projects.

Then, in a number of cases we have sent a man for about 3 months to investigate a small problem and make a report and recommendations.

Mr. VAN PELT. Did that all come under foreign operations? It could not have if it went back to 1938.

Mr. WRIGHT. It was originally under the Department of State, the Interdepartmental Committee for Scientific and Cultural Cooperation. Appropriations were made to that Department and then given out to the cooperating agencies.

Mr. VAN PELT. You also mentioned foreign students taking training in this country. How many do you have and could you give us a few of the countries?

Mr. WRIGHT. At the present time we have only 12, and Thailand, Indonesia, Bolivia, Mexico, Colombia, and India, I believe, are the primary countries involved.

Mr. VAN PELT. What is your opinion of this program as far as changing the diet or adding to the diet of these countries?

Mr. WRIGHT. Let me say one word preliminary to that. The thought in getting the students here is that when the United States technicians start a program in the country and get this moving that there will be a growing group of technicians of the foreign country to pick it up and carry it on. You want to know what I think of the program?

Mr. VAN PELT. Yes.

Mr. WRIGHT. Well, officially, of course, I am not entitled to opinion.

Mr. VAN PELT. Well, we can have an opinion off the record.

Mr. WRIGHT. It is the established foreign policy of the United States Government, and I am merely carrying it out.

Mr. TOLLEFSON. Mr. Chairman, could I ask a question?

The CHAIRMAN. Mr. Tollefson.

Mr. TOLLEFSON. Did you show Mexico how to catch shrimp?

Mr. WRIGHT. Well, it happens that we sent a man there just about the time the thing was developing, and I don't have any doubt at all that he was an important factor in bringing that about. I think it would have happened anyway, but he hastened it and brought it to a higher peak.

Mr. TOLLEFSON. How about Peru and tuna fishing?

Mr. WRIGHT. You remember that development started during World War when we were very anxious to get food of all kinds. There is no question but what we aided them in establishing an industry which is now in partial competition with the United States.

Mr. TOLLEFSON. Is the tuna fishing in Peru a fair-sized industry?

Mr. WRIGHT. It is considerable industry for them. It is a rather small percentage of our total catch. I have forgotten the figures. I think it is something less than 15 percent.

Mr. TOLLEFSON. Is there any relationship between our showing them something about tuna and their fixing their jurisdictional limits out to the 200-mile limit?

Mr. WRIGHT. I would rather not comment on that. I think that is a kind of difficult problematic question and outside of my field. I believe that the Department of State ought to speak on that subject.

Mr. TOLLEFSON. Well, the question is there in the record anyhow. That is all, Mr. Chairman.

Mr. ALLEN. Mr. Chairman, may I ask a question off the record?

The CHAIRMAN. Yes.

Mr. ALLEN. Do you have control of a program of a few years ago in which America-constructed fishing vessels were sent over to Japan or China in an effort to teach them our way of fishing?

Mr. WRIGHT. No; I was not concerned with that, but I have a smattering of knowledge on it.

Mr. ALLEN. I think in that instance we not only sent the vessels over but American fishermen manned the vessels.

Mr. WRIGHT. That is right.

Mr. ALLEN. Do you know what the result of that experiment was?

Mr. WRIGHT. I think it is a little too big for me to comment on. I do not have enough exact knowledge, but apparently they were very successful in catching fish but encountered numerous problems beyond that, marketing and distribution; that sort of bogged the program down.

Mr. ALLEN. The market would not take the fish, and the people did not use them. Was that about the experience?

Mr. WRIGHT. I think I would rather not comment on that, because I do not know enough about it.

Mr. ALLEN. Thank you.

Mr. WRIGHT. I have mentioned in response to questions something about the programs in Mexico and Peru. I might say that in Mexico we have a very instructive situation in that in a short period of about 12 years we went from almost no exploitation of a resource, the shrimp resource, to the point where it is now. The return per unit of effort is going down, and they are having to think of the problem of conservation and also have exploration to new grounds to maintain their catch.

I think that is rather instructive because we would think ordinarily that the stocks of shrimp would be inexhaustible, but in a short period of years the demand for them has been so great that people have gone in large numbers and built boats to the point where they are no longer able to catch as many per boat and unit of effort as they were originally.

Mr. TOLLEFSON. How would you regulate the taking of shrimp?

Mr. WRIGHT. How would you?

Mr. TOLLEFSON. How could it be done?

Mr. WRIGHT. Well, I presume that one way would be a limited season and another way would be a limited size of boat, although that might not be a practical one after you had already had a fleet established.

Mr. TOLLEFSON. Your regulation would largely have to do with the landing of the fish, would it not? Anybody could go out in the international waters and catch them, could they not?

Mr. WRIGHT. I think it would have to be based on landings; yes.

A third country that I would like to mention in which we have had some hand in developing the fisheries is Liberia, on the west coast of Africa. We sent two men in there, one a marine biologist and technician and the other a fresh-water man.

The fresh-water man went up into the interior and was extremely successful in the 2 years that he was there in developing a pond-fish program. He found a very enthusiastic response to the Liberian farmers in that area, and there was a great deal of the spreading of the program to private individuals and to the large rubber plantations of the Firestone Co. nearby.

The CHAIRMAN. What have you done off the Continental Shelf on the Atlantic coast to experiment in finding out whether there is any fish down in the subwaters?

Mr. WRIGHT. In this program, nothing, sir.

The CHAIRMAN. Who has done something? Has anybody done anything?

Mr. WRIGHT. I will have to plead ignorance.

The CHAIRMAN. I mean we are going around the world to find fish everywhere else and experiment about it. Here is the great Atlantic off here and the subwaters of the Continental Shelf. What have we done about that?

Mr. WRIGHT. I am not thoroughly acquainted with that. Of course, the Fish and Wildlife Service has a program of exploratory fishing for tunas in the Gulf of Mexico and also in New England, and it was my understanding that that program has been very successful, particularly in New England, in locating stocks of tuna.

The CHAIRMAN. They have been fishing off the Newfoundland coast and off the New England coast a long time before the Fish and Wildlife Service came into existence, have they not?

Mr. WRIGHT. Yes, sir.

The CHAIRMAN. Suppose you just extend that in the record at this point, sir. This is all foreign affairs, is it not?

Mr. WRIGHT. Yes.

The CHAIRMAN. We appreciate your being down here very much, and we will just extend that in the record.

Thank you, sir.

The next witness is Mr. Culbreath.

Mr. SUOMELA. Mr. Chairman, before the next witness appears, may I make a statement and ask for information?

The CHAIRMAN. Yes.

Mr. SUOMELA. If you really think in the first day's testimony there were parts of the refuge program left where discussion was not had on the use of duck-stamp funds as far as refuges were concerned, we thought this morning we would have Mr. Salyer here to complete that testimony, but he was called out of town.

Would you like to set up someday next week to hear the rest of that particular testimony, Mr. Chairman?

The CHAIRMAN. If there is something that he did not include in his remarks, he may have it prepared and submit it to the part of the record in which he testified.

TESTIMONY OF JACK C. CULBREATH, ASSISTANT CHIEF, DIVISION OF INFORMATION

Mr. CULBREATH. Mr. Chairman and members of the committee, my name is Jack Culbreath. I am Assistant Chief of the Division of Information for Fish and Wildlife Service.

I had my formal training at the University of California and am a graduate of the school of forestry and the school of letters and science in zoology.

My specialty was in drainage problems, and I did my first work with the Forest Service, later going with the National Park Service in early 1942 and had my work interrupted by service in the Army.

After the war I started my work again with the State of Colorado as a wildlife technician and was later transferred into the central office to assume responsibilities in the information and educational field.

I came with the Fish and Wildlife Service in the summer of 1951 and have held a position as the Assistant Chief since that time.

During the past few days you have listened to a number of our operating branches explain the responsibilities that the Director of the Fish and Wildlife Service has to assume. In each of the basic wildlife acts you will find references to these responsibilities of the Director for dissemination of information. You might call it public relations, information service, extension servive, conservation education.

Irrespective of what title you tag on them, they are all the same, a fundamental responsibility of the Director.

In the absence of this information, education, extension service, or whatever you choose to call it, you are actually defeating the very purpose for which the operational services that you have had explained here exist.

Many of the acts, it is interesting to note, predate the consolidation of the old Bureau of Biological Survey and the Bureau of Fisheries. This is particularly important as we refer to the Biological Survey because here you have evidence of the fact that Information was established in those early periods of the Migratory Bird Conservation Act primarily to expedite extension services to farm groups throughout the country in the control and management of migratory birds.

We also find a parallel to it in the Black Bass Act, where extension services are referred to here, to the various States of the country.

So this is a fact, that information or extension services were realized early in fish and wildlife work, but I regret to say that, even with this early origin, the pace of this work has not been able to keep up with the operational phases.

I would like to compare the size of operation, if I may, of the Federal program of the Fish and Wildlife Service to the program that I left in the State of Colorado. I think it will bring out my point here of how inadequate we feel that the program we are doing is today.

In the State of Colorado we had an annual budget of $127,000 for the work within 1 State. In the last 3 years that I have seen budgets of the Fish and Wildlife Service or had anything to do with them, we have had an average budget of around $140,000 to $144,000 to carry out the broad functions of information for the Fish and Wildlife Service.

Where, then, is the problem in this inadequate information program? I feel certain that it lies in the fact that we have not had an opportunity as we have here today to explain what the broad objectives and philosophies of our information program are to the many Members of Congress who pass upon our legislative acts.

For example, in section 108 of the Appropriations Act for 1955 there is a direct limitation on this type of work, and it makes it practically impossible for us to afford the services demanded by the general public, whether it be for general information, conservation education, extension service, or any of the other related fields in this office's responsibility.

At the present time our operation is devoted 65 percent to the editing and publishing of technical reports which you might classify as the completion reports for the various projects that you authorize by acts of Congress. These reports for the most part are in a form highly technical and not of a general nature suited for ready consumption by the lay public.

In addition to this we devote 5 percent of our effort to the writing and publishing of nontechnical publications. You might say that this is an incidental writing and publishing act, and I have examples on your desk today of Visiting a Wildlife Refuge, Attracting Birds, or the assistance in the writing of a book for the Boy Scouts of America on what the philosophies behind conservation of our wildlife resources are.

This will all be contained in 5 percent of our effort.

Ten percent of our effort will be concerned with the production and editing of visual aids. These might be visual aids in the form of slides that are used by our many game agents throughout the country to acquaint the general public with the species of waterfowl that they are attempting to protect and manage. Visual aids also may be concerned with films that we distribute to the schools throughout the country and to the general sportsmen's clubs of the country who request information on various activities in this form.

At the present time almost 79 percent of our use of motion-picture films are used in the public schools. Ten percent of our effort will be devoted to current information. I don't know just how to break this down for you, but contained in the 10 percent of current information is an infinitesimally small percentage of effort devoted to direct press agentry. That is preparing of press releases on consumption of fish, and other press releases.

By far a larger percentage of this 10 percent of our effort is concerned with the production of the Secretary's annual report and other voluminous reports that are requested by Congress, by the Secretary's office, and by the Director.

So, therefore, we have called this current information to distinguish it from a press office because the function in press agentry is so comparatively small.

During the last 2 years we have added a function that takes approximately 8 percent of our effort in the conservation education field. We have had coming to the Service direct requests from approximately 15 national youth organizations for work in conservation of wildlife resources. Our greatest effort has been directed to the Boy Scouts of America program which was just successfully completed here

in the early part of March by the report to the President of the Boy Scouts on their conservatin good-turn year.

The first thing that we contributed to that program was the merit badge pamphlet which you have on your desk written by Dr. Durward Allen, then the Acting Chief of our Branch of Wildlife Research, to explain in part the philosophies of management of the wildlife resources throughout the country, State and Federal. This particular pamphlet was put into the hands of 3½ million Boy Scouts through the facilities of the Boy Scouts of America and the North American Wildlife Foundation at no cost to the United States Government aside from the time and effort in the preparation of the manuscript.

Other groups that have solicited assistance have been the Future Farmers, the 4–H Club boys and girls, the DAR youth groups, the junior chamber of commerce youth groups, the Izaak Walton League of America young outdoor program, the National Association of Biology Teachers, the National Association of Science Teachers, the Conservation Education Association, the Garden Clubs of America, the Federation of Women's Clubs, the Wildlife Federation, and numerous freelance writers and publishers that are putting material before the general public concerned with this subject of conservation of wildlife resources.

We have attempted to help these people in organizing their materials or in organizing their programs, but for the most part the actual supplying of material has been nothing more than the preparation of the original manuscripts or the technical editing of original manuscripts prepared by these organizations.

In some cases we have taken active organizational part in the programs such as with the Boy Scouts of America. We have worked very closely with the National Headquarters in attempting to help them get in touch with technical people throughout the United States so that their program will have a firmer base under it and will not be a "busy project for young boys."

In addition to this we helped conduct the meeting last year of the Young Outdoor American Conference of the Izaak Walton League of America in Chicago and at the present time we are considering taking an active part in the coming year in the 4–H Club Congress in Chicago.

The numbers of people being served by such work are estimated at between 8 million and 10 million boys and girls that are active in these programs so I am sure that you can see the far-reaching extent of this particular activity and I would like to recall again that to date we have only been able to devote approximately 8 percent of our division's effort of work to this important, long-range, educational program that we call conservation education.

The remaining 2 percent of our effort is concerned with in-service problems and training within our Bureau, approximately 1 percent; and 1 percent for administration and the very broad field of general public relations.

From this breakdown I am sure that you can immediately see that with 70 percent of our effort in the editing and publishing of reports, that there is where our major effort lies. We are far from a balanced program that will give the needed emphasis to the program as we

see it today. This has been substantiated during the last year by two survey reports. The first was a survey of the Secretary of the Interior to investigate informational activities throughout every Bureau of Interior of which we were just one small part.

More recent was a survey designed at studying reorganization plans for the Fish and Wildlife Service, also ordered by the Secretary of the Interior.

In this latter report an important note is contained on page 19 in reference to these educational services when they are discussing them and if I may read this particular quote from this report it refers to the branch of game management:

Conservation education and information.—Both education and information in the sense of this recommendation are recognized tools of sound and effective regulation and enforcement. With the manpower available the service can hope to observe and detect only a minute fraction of the actual and potential violators. The purposes, objectives and reasons for existence of the service are only dimly known to the public affected by them, as will be discussed in further detail in the section on public relations. The branch of game management personnel should be the arm of the service specifically assigned to public platform presentation of the story and every effort should be made to implement their work with education and information facilities. The ability to effectively engage in this work should become one of the criteria in hiring new personnel for game management.

The importance of this is the fact that has been pointed out here by Dr. Linduska and others that we have a staff of game management agencies throughout the country to carry the service directly to the youth groups and other organizations demanding it, but we have such a meager staff for the preparation of the materials to furnish to such a widely distributed active force in the field that we are not keeping abreast of the current needs of our operational branches.

That is the point that I tried to make in my opening remarks at this hearing.

To give you some idea of the volume of publications that we now handle we have processed annually, for the last 3 years, an average of 150 items edited and processed for publishing in our office. These range from 1-page technical reports to reports or volumes of over 600 pages in 1 publication such as the Gulf of Mexico, Its Origin, Waters, and Marine Life, that I am sure some of the members of this committee are familiar with; that voluminous report that was just issued this last year.

We also must process for printing an average of 250 items that are not left for editing in our office, but are edited by the various technical branches of the Service since they are short reports of one form or another.

With these materials produced and available from our publication and distribution office we have averaged servicing around 50,000 requests a year. Of importance in these requests that have been serviced is the fact that 30,000 of these requests are for conservation education materials, teachers and students asking for specific information on wildlife conservation.

I am sure that these requests are going to continue to be even larger year after year because throughout the country there is a tremendous effort being made by all conservation agencies, State and Federal, but it is evident at our annual meetings of these State and Federal groups that the combined efforts of all are not beginning to approach

a 50-percent efficiency rating in supplying or meeting the demands of the using group. The using group by far, as I have pointed out, are the teachers and the youth of the Nation.

I am sorry that I cannot give you the figure of the total number of students enrolled in the 10th, 11th, and 12th grades in high school throughout the Nation, but they are the largest recipients of our material, the ones that are requesting the most of it. That is, they are the largest aside from the 8 to 10 million organized youth in the youth groups that I mentioned previously.

This, then is a very brief and hurried outline of our field of work.

We feel that serious studies should be made of our appropriation accounts so that we would be better able to meet the informational services particularly in the conservation education field. This field is removed from affecting in any way current legislation or press agentry propagandism or pressures that I am sure Congress is aware of that can come out of informational services. That is primarily contained in direct press agentry but this particular field of conservation education is so far removed from that field that I am certain if congressional committees were to study it not only in our Bureau but in such services as the Soil Conservation Service, the Bureau of Indian Affairs, the National Park Service, and others that are actively engaged in the work today, you would find that here is a specific field in the information program that should receive your attention.

Mr. TOLLEFSON. May I ask a question?

The CHAIRMAN. Yes.

Mr. TOLLEFSON. The success of your conservation program depends in large measure, does it not, upon public knowledge and public acceptance and public compliance with conservation laws and regulations? Is that not true?

Mr. CULBREATH. Very definitely. More than 20 percent of the American people are hunting or fishing for their recreation as indicated by the sale of licenses. Add to this group the persons hunting or fishing that are not required to have licenses and the many persons who are concerned with commercial fisheries and you have a tremendous population that should know the fish and wildlife conservation laws. Just a small uninformed portion of this group of people who unintentionally violate the regulations can handicap many sound conservation programs.

Mr. TOLLEFSON. Is that your objective largely, to let the public know what the conservation problems are?

Mr. CULBREATH. Absolutely. As I mentioned in my first statements we must inform the public, particularly in laymen publications, a publication or informational program suited to the laymen's consumption, not suited to the exchange of technicians or the exchange between technical groups of technical information. We have to abstract in an accurate biological manner, these technical publications so that the lay public can understand the objectives and philosophies behind the various conservation programs that we are carrying out, and we have not begun to scratch the surface of our responsibility in this field.

Mr. TOLLEFSON. Without public knowledge and acceptance and compliance with your conservation program you might run into a considerable amount of trouble yourself in your program, might you not?

Mr. CULBREATH. Very definitely; misunderstanding of our objectives could very definitely bring sentimental objection to a program. I heard you discuss here this morning the sentimental attitudes toward fishing with fishing gear of one form or another. I think there is a very direct example of where conservation education could have been fundamental in explaining what is taken, how it is taken and what utilization is made of the products taken by these various methods, and that would have been enlightening enough so that you did not have sentimental voting for or against a particular measure.

Mr. TOLLEFSON. With our population on a rather rapid increase the demand for your services probably will increase accordingly, will it not?

Mr. CULBREATH. We feel that it is definitely reflected in the annual increase over just as short a period of time as I have had to observe it of 3 years. We can notice an increase annually.

In the last 3 years I would say that our increase of requests for conservation services have been adding at the rate of 30 percent per year.

This serious problem has challenged many teaching groups and other national organizations. They are doing a fine job of teaching the fundamentals of resource conservation, but they need more materials. As a result they are demanding our help for information in all forms; publications, visual aids, press and television releases, and personal services. During the last 3 years requests of this type have increased at an annual rate of 20 percent. We can expect this rate to increase even faster as people learn where information is available.

Mr. TOLLEFSON. That is all, Mr. Chairman.

The CHAIRMAN. Are there any questions?

Mr. BYRNE. No questions.

The CHAIRMAN. I want to thank you very much for your fine statement.

I want to say that it has been most interesting to have the splendid personnel of the Fish and Wildlife Service here to tell their story to this committee. I want to compliment the Service for the stature and character and ability and background of the men who have appeared here before the committee.

Is there any statement that you would like to make, Mr. Tollefson, about the hearings?

Mr. TOLLEFSON. I would just like to concur in what the chairman has just said. I am very pleased that the chairman arranged for these meetings not only with the Fish and Wildlife Service, but with the Maritime Administration also.

I do not recall in 8 or 9 years that it has been my privilege to serve on this committee that we have obtained so much information in such a comparatively brief period of time. I think that the information we have received will prove invaluable to the committee.

The CHAIRMAN. Would you care to make a statement?

Mr. BYRNE. All I can say is that being a new member of the committee it has been very interesting to me to sit here and listen to the witnesses, people who know their subject, and I have enjoyed it very much.

The CHAIRMAN. Mr. Allen?

Mr. ALLEN. Mr. Chairman, I agree thoroughly with what has been said. One of the great surprises of this set of hearings from my

standpoint has been the fact that, although I have been sitting on this committee with you for 8 or more years, there is still a large body of information which was never made available to us until these hearings and crossroads into which I never went during these 8 years.

I think it was very valuable to have it all presented in a complete and organized form. I thank you for making that opportunity available to us.

Mr. SUOMELA. On the record, Mr. Chairman, on behalf of the Director, it certainly was a privilege for him and his staff to present the program of the Fish and Wildlife Service. It has been an honor.

The CHAIRMAN. The committee will adjourn to reconvene tomorrow morning at 10 a. m. to hear witnesses from the Coast and Geodetic Survey.

(Letter and enclosure from John L. Farley follow.)

DEPARTMENT OF THE INTERIOR,
FISH AND WILDLIFE SERVICE,
Washington, D. C., April 1, 1955.

Hon. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D. C.

MY DEAR MR. BONNER: This will acknowledge your letter of March 17[1] regarding the Service's activities with respect to striped bass. We fully recognize the major importance of this species along the Atlantic coast both to the commercial fisheries and to the sport fishermen for whom it furnishes thousands of hours of healthful recreation.

Since the Service has received no appropriation for striped bass research, it was thought best to encourage research among the individual States. To act as coordinator of the program we appointed Dr. Edward C. Raney, a professor at Cornell University with long experience in the investigation of striped bass and with intimate knowledge of the problems of individual States with respect to the species. Working through the Atlantic States Marine Fisheries Commission we have succeeded in setting in motion a cooperative Federal-State program known as the Atlantic States cooperative striped bass program, which now involves the activities to a greater or lesser extent of 12 Atlantic Coast States and the expenditure of $82,500 in fiscal year 1954–55. Five of the major programs are financed through Federal aid to fisheries grants under the Dingell-Johnson Act.

Since a great deal of the basic life-history studies have been made in the past, work of the present program is concentrated on points for which knowledge is lacking or deficient. In many States the amount of the catch and the fishing intensity, particularly for the sport fisheries, is not known and several of the programs are designed to furnish this type of information. It was previously thought that most of the striped bass along the Atlantic coast came from Chesapeake Bay, but now it is known that other independent stocks exist in such rivers as the Hudson and Delaware. Investigations are being carried on to determine the extent of contribution of these independent stocks to the coastwise catch of striped bass and also to find out whether there are additional independent stocks in other rivers along the coast. Finally, studies of the production of young striped bass are being made. It is known that this fluctuates tremendously from year to year, but the causes for such fluctuations have yet to be ascertained.

In addition to coordinating the Atlantic States program, the Service is providing direct assistance in some States. For example, the Service has, during the past 3 years, cooperated with the North Carolina Wildlife Resources Commission in studies of means and measures which may be undertaken to preserve the striped bass fishery of the Roanoke River in the vicinity of Weldon. You will recall that releases of water from John H. Kerr Reservoir were the subject of recent discussions you had with Under Secretary Davis, this Service, the

[1] The letter of March 17, 1955, referred to in Mr. Farley's letter, requested additional information relative to the activities of Fish and Wildlife Service with respect to striped bass.

Corps of Engineers, Southeastern Power Administration, State agencies and others. In the same connection, this Service has studies and reported on two projects of the Virginia Electric & Power Co.—the Roanoke Rapids project, now nearing completion, and the Gaston project, which has not yet been licensed by the Federal Power Commission. We are currently giving consideration to an amended application for license for the Gaston project. Investigation of the whole problem of maintenance of striped bass in the Roanoke River in the face of increased pollution and hydroelectric developments will be continued again this year on a cooperative basis in the hope of obtaining sufficiently firm data to determine the minimum needs of the fishery. Interim provisions of flows from Kerr Reservoir sufficient to maintain the fishery has been assured by the Corps of Engineers for this year.

Attached for your information is the most recent progress report of the Atlantic States cooperative striped bass program furnished by Dr. Raney. It indicates the activities and findings in the individual States.

Sincerely yours,

JOHN L. FARLEY,
Director.

SECOND PROGRESS REPORT OF THE ATLANTIC STATES COOPERATIVE STRIPED BASS PROGRAM

By Edward C. Raney, Coordinator, United States Fish and Wildlife Service, and Department of Conservation, Cornell University, Ithaca, N. Y.

This report has been prepared for the information of biologists and administrators interested in the striped bass and for others associated with the Atlantic States Marine Fisheries Commission, which has sponsored the program through its striped bass committee. Adequately financed research programs undertaken with the assistance of Dingell-Johnson funds are now in progress in Massachusetts, New York, Maryland, South Carolina, and Florida. Other State agencies and universities are carrying on activities as noted below. The estimated expenditure for striped-bass projects for the fiscal year 1954–55 is $82,500. The anticipated duration of most programs is 3 years.

Massachusetts.—Biologists William A. Fitzpatrick and John Cookson, division of marine fisheries, department of natural resources. J. A. Posgay, former leader, has returned to a study of scallops. The first season's effort was largely an inventory of the catch. More than 7,000 anglers were interviewed in the field. South of Boston the main fishery is located south of Plymouth; on the north shore fishing is concentrated near Plum Island, Ipswich Bay, and the lower Merrimack River. Poor returns were obtained using a postcard survey on Cape Cod Canal. Aerial surveys were of little value in the inventory since most of the effective fishing is done at night. Scales, weights, and lengths were obtained on 600 adult bass; some weighed more than 50 pounds. A number of attempts were made to obtain bass for tagging in the Merrimack River and at Martha's Vineyard, but none were successful. The usual fall grouping of bass did not materialize along the Massachusetts coast. A group of wintering bass in Taunton River at Fall River is under investigation.

Rhode Island.—Through Thomas J. Wright, division of fish and game, department of agriculture and conservation, samples of small striped bass for racial and other studies were obtained from Sakonnet Point, in April 1954. About 30 bass (12 to 16 inches) were tagged during the spring migration.

Connecticut.—Joseph Piza, State board of fisheries and game, supplied juvenile and adult striped bass from the western quarter of Long Island Sound for racial studies. Scale samples were also obtained from many adult bass. A D–J project has been authorized and will be activated when a biologist is appointed.

New York.—Biologists Warren F. Rathjen and Louis Miller, New York State Conservation Department. In May and June 1954 plankton net sets for eggs and larvae were made in the Hudson River. Regular collections of young were made along shore throughout the Hudson beginning in early July when the young first came inshore at a length of less than 1 inch. The 1954 year class in the Hudson seems to have been exceptionally large, even more so than the successful 1953 year class. Also many yearlings were found. The centers of the summer-sport fishery in the Hudson were located. Limited tagging was done in the river during the summer and at West Hampton, Long Island, in the fall. Petersen disc and jaw tags have been used on fishes under 20 inches; the use of jaw tags and internal tags with plastic streamers is planned for next season. Meristic counts by E. C. Raney and W. S. Woolcott of young of the 1954 year class from

the Hudson River confirm the previous conclusion that the Hudson race is a separate stock. William S. Woolcott has made a study on the relationship between salinity and the habitat of young striped bass in the Hudson River.

New Jersey.—The division of fish and game, department of conservation and economic development, continues an inventory of recreational fisheries including the striped bass. Seining surveys of coastal rivers supervised by Grant F. Walton during the summer of 1954 yielded young striped bass from Maurice and Great Egg Harbor Rivers. With the assistance of Alfred S. Jones, division of fish and game, in early August E. C. Raney and W. S. Woolcott made a brief seining inventory of the lower Delaware River but found few young. Juvenile and adult specimens for racial studies were collected by Mr. Jones.

James R. Westman, department of wildlife conservation and management, Rutgers University, continues to direct tagging studies and population counts using local skin divers. He plans to tag bass during February and March. Grant F. Walton continues his serological studies.

Delaware.—Statistics on the fisheries including striped bass are collected under a project supervised by the division of marine biological research, University of Delaware. The winter trawl fishery for striped bass is important although short.

Maryland.—Biologists Edgar H. Hollis and Harold A. Davis, Jr., Maryland department of tidewater fisheries. During 1954 a laboratory was set up at Matapeake. A study of spawning was made in the Choptank, Nanticoke, Wicomico, Potomac, Susquehanna, Elk, Chicamacomico, and Pocomoke Rivers. The principal spawing grounds of bass have been located and more than 300 rock were tagged at or near the spawning grounds. Most tag returns were from nearby areas. Young and juvenile fish were sampled at regular intervals through the summer to obtain data on comparative growth rates. These specimens have been made available to Raney and Woolcott for racial study. Data on lengths, weights, and age have been obtained for large bass. An electric shocker was used with little success in an attempt to sample weedy shore areas of large rivers for young. The growth and activities of striped bass in small ponds are under observation.

Romeo Mansueti, of the department of research and education, Solomons, Md., collected young striped bass for use in racial studies, and Richard E. Tiller is supervising a continuing study on the monetary value of Maryland sport fishery.

Under the direction of Profs. R. A. Littleford and J. Francis Allen, department of biology, University of Maryland, Thomas E. Carver, Jr., and Lloyd W. Shearer are studying the gonads, determining sex ratios and investigating secondary sex characteristics.

Virginia.—J. L. McHugh, director of the Virginia fisheries laboratory, made available the research vessel *Virginia Lee* during a 5-day period in July 1954. With William H. Massmann, biologist, Virginia fisheries laboratory, Raney and Wolcott seined critical areas in the James, York, and Rappahannock Rivers to obtain young for racial and growth studies. There seems to have been a successful 1954 year class in both the James and York Rivers but that produced in the Rappahannock River was perhaps below average. The Virginia fisheries laboratory has recently inaugurated an expanded fisheries program which will collect catch records.

North Carolina.—Through J. H. Cornell and A. W. Dixon, wildlife resources commission, specimens were obtained from the Roanoke River for an attempt to delimit the so-called short rock. The commission's hatchery at Weldon supplied eggs and larvae to aid biologists in identifying material from natural sources. Additional samples of young were obtained by Raney and Woolcott from the Albemarle Sound for racial studies. The 1954 year class strength seemed to be about equal to that of 1953.

South Carolina.—Biologists George D. Scruggs, Jr., and Jefferson C. Fuller, Jr., wildlife resources department. The study is concentrated on the Santee-Cooper Reservoirs. More than 600 bass, from 10 to 35 inches long, have been tagged below Pinopolis Dam. Of the 17 recaptures, 14 were taken downstream but within the Cooper River and 3 had moved through the navigation locks into Lake Moultrie. However, trammel net operations have shown relatively little movement through the navigation locks. Most of their findings have been summarized in a paper in press. A creel census over a 3-month period, October to December 1954, which is conservatively estimated as accounting for about one-sixth of the total fishing pressure recorded, 2,294 fish averaging 8.9 pounds per fish. It is estimated that over 100,000 pounds of striped bass were harvested by sport fishermen during the period.

Racial studies by Raney and Woolcott (in press) made possible by the material supplied by G. D. Scruggs, has resulted in the tentative conclusion that the South Carolina stock of striped bass is an endemic race which in turn is differentiated into an upstream form which may not go to the sea, and a downstream form which at least goes downstream to brackish water. There is little interchange between the South Carolina stock and that of Albemarle Sound, N. C., or the St. Johns River, Fla. These results were reported by Raney as part of a panel on striped bass at the November 1954 meetings of the Southeastern Association of Game and Fish Commissioners held in New Orleans. G. D. Scruggs and W. M. McLane also participated.

Georgia.—There is interest on the part of David Gould and Frank T. Knapp, division of coastal fisheries, State game and fish commission, in activating a study of striped bass and other fishery resources of tidal waters. The Altamaha River and several of the smaller rivers have striped bass populations which apparently are not being fully utilized.

Florida.—Biologist William M. McLane and assistant Joe E. Ward, Florida Game and Freshwater Fish Commission. A group of large striped bass was located in August in a tributary of the St. Johns River. Several hundred were tagged, scales, fin and scale counts, and data on general condition and parasites were obtained. These fish suffered an unusually high mortality, not all of which could be attributed to netting or other handling. Studies by Raney and Woolcott show that the St. Johns race is unique in having a very low lateral line scale count and an extremely high fin ray count. It is tentatively considered as a separate race, although the status of the striped bass populations in the rivers immediately to the north are as yet unknown. Attempts at locating populations in west Florida have accomplished little to date.

The United States Fish and Wildlife Service has contributed the services of a coordinator (part time) and an assistant, William S. Woolcott (part time). The latter, a graduate student at Cornell University, has also been aided by a grant from the Sport Fishing Institute. They have continued their studies on the racial composition and migration of stocks. During the summer of 1954, field studies were made in New York, Virginia, North Carolina, and South Carolina in an attempt to locate the precise habitat of young and to attempt to assess year class strength. The coordinator has assisted State personnel when called upon to do so and has helped in outlining most of the projects.

Tagging.—The following information was obtained from Vadim D. Vladykov, of the Laboratory of the Department of Fisheries, Quebec. Biologists have continued to tag striped bass in the vicinity of Quebec and approximately 300 were tagged during the summer of 1954, making a total of 1,500 which have been tagged over a 5-year period. They have successfully used a monel metal jaw tag which has yielded returns after 4 years. These tags apparently work well under the conditions obtaining in the St. Lawrence River. Incidentally, one of these jaw tags was recovered from a sturgeon after 9 years. Present indications are that the St. Lawrence striped bass population is a semiendemic stock which is underexploited. Dr. Vladykov suggests that those who are interested in tagging small striped bass might find the jaw tag better adapted to their uses than the Petersen disc attached through the back. The jaw tag is a split ring which holds a plastic streamer carrying the data and which is inserted around the dentary. Special applicator pliers are required. New York and Maryland are trying out this tag. Plans are also under way in New York to try out an internal tag with an external plastic streamer.

Massachusetts, Maryland, and Rhode Island are using Petersen disc tags furnished by the Fish and Wildlife Service. A $1 reward per return is paid by the Service. New York, South Carolina, and Florida are using State tags, and New York alone is paying a reward ($1). A supply of stainless steel pins is now available for those who would like to try them with the Petersen discs.

Atlantic City meeting.—The Northeastern Division of the American Fisheries Society will meet in Atlantic City, N. J., on March 23, 24, and 25, 1955. It has been suggested that those interested in the striped bass get together and plans for a meeting are presently being made. E. C. Raney will give a paper "Recent Investigations of the Racial Status of the Stocks of Striped Bass," at the marine fisheries panel on March 24.

RECENT LITERATURE

Skinner, John E., and A. J. Calhoun. 1954. Field tests of stainless steel and tantalum wire with disc tags on striped bass. Calif. Fish and Game, 40 (3): 323–328.

Collyer, Robert D. 1954. Tagging experiments on the yellowtail, *Seriola dorsalis* (Gill). Ibid.: 295–312.

Raney, Edward C., William S. Wolcott, and Albert G. Mehring. 1954. Migratory pattern and racial structure of Atlantic Coast striped bass. Trans. 19th N. A. Wildlife Conf.: 376–396. A reprint of the latter is enclosed for those who have not already been supplied with one.

PAPERS IN PRESS

Scruggs, George D., Jr., and Jefferson C. Fuller, Jr., 1955, Indications of a freshwater population of striped bass, *Roccus saxatilis* (Walbaum), in Santee-Cooper Reservoirs. Trans. Southeastern Assoc. Game and Fish Commissioners.

Raney, Edward C., and William S. Wolcott, 1955. Racial status of the striped bass, *Roccus saxatilis* (Walbaum), in southeastern United States. Ibid.

(Whereupon, at 12:25 p. m., Tuesday, March 15, 1955, the hearing was adjourned.)

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